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ABSTRACT

In New York State, all plans and specifications for the erection, repair, enlargement, or remodeling of school buildings in any public school district must be reviewed and approved by the Division of Educational Facilities Planning. The Division also strives to offer advice and counsel to school districts and architects to help them resolve their school building problems. This 1975 edition of the manual includes all amendment and revisions to the original manual issued in 1965. Both minimum requirements, which must be followed, and optional recommendations are included. The words "shall" and "must" indicate requirements "should" and "may" indicate recommendations. The requirements and recommendations are arranged under the headings of structural and safety planning; materials; visual environment; site and utilities; mechanical and electrical planning; heating, ventilating, and air conditioning; plumbing and gas facilities; electrical work; and existing buildings. Thirteen appendices contain additional material, and an index concludes the manual. (Author/MLF)

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MANUAL

OF

PLANNING STANDARDS

FOR

SCHOOL BUILDINGS

The University of the State of New York
State Education Department
Division of Educational Facilities Planning
Albany, New York

1977

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PREFACE

Among the many responsibilities of the Commissioner of Education is that of establishing and enforcing school building construction standards for the health, comfort and safety of pupils attending the public schools. Accordingly, a procedure has been established whereby all plans and specifications for the erection, repair, enlargement or remodeling of school buildings in any public school district in the State must be reviewed and approved by the Division of Educational Facilities Planning. However, the Division strives to extend its service far beyond the function of regulations and to offer advice and counsel to school districts and architects to help them resolve their school building problems.

This 1975 edition of the manual includes all amendments and revisions to the original manual issued in 1965. That manual, plus updating revisions, proved invaluable to school district architects and simplified and expedited review and approval of plans and specifications by the Division. We would like to emphasize several things about this publication.

1. Included herein are both minimum requirements which must be followed and recommendations which are optional. The distinction is indicated by the language used (e.g., such words as "shall" and "must" indicate requirements; "should" and "may" indicate recommendations).

2. The requirements stated herein are those which are currently in effect. Revisions will be made from time to time because of changes in fire safety regulations, construction techniques, mechanical developments and changes in materials, as well as by progress in education which has implications for space requirements and types of facilities. As revisions are made they will be distributed in accordance with the latest established list of school administrators, architects and engineers.

3. For information relating to the layout of spaces and recommended equipment for the various curriculums, the Education Department planning booklets for such areas should still be consulted.

The Division actively seeks competent advice and welcomes suggestions as to how its requirements might be improved to keep pace with educational and technical developments. Also, the Division will be glad to consider applications for approval of experimental projects which deviate from established standards if it seems reasonable to expect that important findings may result therefrom.

We urge that school officials confronted with building needs contact the Division of Educational Facilities Planning for consultation before detailed planning is undertaken. In this way costly mistakes and delays may be avoided. Even more important, early consultation will give the Division the opportunity to help districts secure the buildings best suited to their educational needs within the resources available.

GENERAL PROVISIONS

S1 GENERAL

a. Any school district which proposes to erect, repair, enlarge, or remodel a school building must investigate the necessity of submitting plans to the Division of Educational Facilities Planning in accordance with current administrative procedures. The extent and scope of the submission is dependent on size of project and type of school district. See Appendix E.

b. School Boards, School Administrators, Architects and Engineers should thoroughly understand current requirements in respect to submission, review, and approval of plans and specifications and compliance with mandatory health, comfort, and safety regulations. See Appendix E.

S2 AUTHORITY

S2-1 Appraising and Approving School Building Plans

a. The authority of the Commissioner of Education for appraising and approving plans will be found in paragraphs 1, 2 and 3, Section 408 and Section 409 of the Education Law (Appendix C).

S2-2 Planning Standards

a. The authority for the standards set forth in this Manual is derived from:

1. Regents Rules, Section 14.1 (Appendix D.).

2. Commissioner's Regulations, Title 8, NYCRR, Part 155.1, 155.2, 155.3, and 155.4 See Appendix D.

S3 SCOPE

a. This Manual of Planning Standards pertains to all public school buildings, with the exception of those schools in New York City.

b. The Manual covers the construction of new buildings, additions and alterations as described in the Local Finance Law, and as further described in the Regulations of the Commissioner of Education, Part 155. See Appendices C and D.

S4 STATE BUILDING CONSTRUCTION CODE

a. Specific requirements deemed necessary by the Commissioner which are not defined in this Manual shall be in substantial compliance with such provisions of the latest edition of the State Building Construction Code as determined by the Commissioner.

S5 ACCEPTED STANDARDS

a. Structural and mechanical design shall conform to commonly accepted good practice and to the generally "Accepted Standards" listed in Appendix B, except as modified by this Manual.

S6 FINAL AUTHORITY

a. Decisions concerning requirements shall be determined by the Commissioner. In any conflict between the State Building Code, the "Accepted Standards", and this Manual, the requirements outlined in this Manual shall govern.

S7 RESPONSIBILITY

S7-1 Architects and Engineers

a. The structural and mechanical design for new school construction, additions, and alterations and compliance of plans and specifications with the requirements of this Manual are the direct responsibility of the architect and engineers retained by the Owner (Board of Education).

S7-2 School Boards and School Administrators

a. In addition to the School Board's and School Administrator's responsibility for both immediate and long range planning, it is also their responsibility to provide architectural and engineering services and adequate supervision through the architect or engineer for all new construction and for all additions, alterations, and renovations.

S8 REQUIREMENTS MINIMUM

a. Requirements set forth herein are minimum unless otherwise specifically approved by the Commissioner due to unusual conditions.

b. Requirements exceeding those of this Manual may be deemed necessary by the Commissioner to insure health and safety, such as where a building is designed for flexibility, and/or with large open spaces of pupil occupancy, and/or with interior spaces, etc. (such as "loft" plans.) Such a building will be reviewed as to its individual characteristics.

S9 INDEX

a. To avoid overlapping and repetition of material between the various sections, a detailed index has been provided and, as far as is practicable, information pertaining to more than one section will be dealt with only under the one heading to which it is most closely related.

S10 COMPETITIVE BIDDING AND AWARDS

a. See Appendix F.

S11 GLOSSARY AND DEFINITIONS

a. Definition of words, terms, and phrases are listed in Appendix A. See Appendix A.

S12 SUPPLEMENTARY PAMPHLETS AND BROCHURES

a. The Division of Educational Facilities Planning has published a series of pamphlets concerning special areas of education spaces. School planners should still refer to the in conjunction with the requirements and recommendations set forth in this Manual.

S13 DESIGNATION OF SPACES

a. Spaces are approved for pupil occupancy as designated on approved plans. Change of use which might affect the health, safety, and welfare of the pupils shall not be effected without the approval of the Commissioner.

S14 ADMINISTRATIVE PROCEDURES

a. New projects - Section I Advancement of Plans (See Appendix B);

b. Alterations - See Appendix B;

PART I

STRUCTURE AND BUILDING SAFETY

§101 **GENERAL**

a. No construction materials shall be used and no type of construction shall be permitted which would endanger the health, safety, or comfort of occupants of the facility.

§102 **GENERAL REQUIREMENTS FOR CONSTRUCTION**

a. Construction shall be Class "A," "B," or "C" as defined by the local finance law, (appendix C) with fire resistance of structural elements as required herein.

1. Fire resistance ratings shall be as contained in Table C-202-2 of the State Building Construction Code except as modified by §102b and c.

2. The Glossary, (pg. A-2) relates Class A, B, and C construction to Type 1, 2, 3, 4, and 5 construction classification of the State Building Construction Code, Table C-202-2.

b. One Story Buildings: may be Class A, B, or C - Type 1, 2, 3, 4, or 5 construction, except that all places of assembly, excluding gymnasiums, having an area over 4000 square feet (not including stages) shall be Class A - Type 1a, 1b, 2a, or 2b.

c. [illegible]

d. Over Three Story Buildings: shall be Class A - Type 1a, 1b, or 2a construction as determined by fire areas listed in Table C-203-1b and sections C203-1.1 and C203-1.2 of the State Building Construction Code; and shall be substantially in conformance with applicable provisions of the State Building Construction Code as determined by the Commissioner.

§102-1 **ELEVATOR**

a. An elevator for service use as well as suitable for passenger use shall be provided between all levels of multistoried facilities, unless such levels are interconnected by ramps or each level has approved, readily available access to a grade exit. See Appendix M for provisions for the physically handicapped and §300-f.

S103 CORRIDORS

S103-1 General

a. The designated widths of all corridors shall be the clear width, free of all fixed and movable obstructions except as noted here:

1. Drinking fountains may project 4 inches.
2. Non-recessed enclosures adjacent to exits may be used where exit doors are narrower than the corridors, but shall not project beyond exit door frames.
3. Doors serving spaces used strictly for custodial storage and similar use may swing into a corridor.
4. For places of assembly see "exits" S104-2.
5. All other equipment such as fire extinguishers, gates, rolling grilles, and radiators (except as noted in #2 above) shall be fully recessed.

b. In case lobbies or corridors are used for purposes other than circulation, they shall be planned with full uninterrupted aisles equivalent to required corridor widths and separated by a fixed rail or other type of approved permanent divider.

c. Any point in any grouped floor corridor must be within 150 feet along the line of travel to an exterior doorway. Any point in a corridor other than a ground floor corridor shall not exceed 120 feet along the line of travel to the nearest enclosure of an exit stairway.

d. [illegible]

e. In "OPEN PLAN" buildings or portions of buildings so planned which do not have corridors in the traditional sense, no point in the open-planned area shall be more than a 75 foot straight line distance to an exit into a separate smoke zone. Each open-planned area must have exits into separate smoke zones at remote locations. Such exits may be exterior doors, enclosed stairs, smoke barriers and/or approved exit passageways. See also S104.6 Spaces of Pupil Occupancy without corridor concept; S109, Smoke Control.

S103-2 Main Corridors

a. A main corridor is one which serves more than four standard classrooms, or more than 150 pupils.

S103-2 b. Minimum clear widths:

1. Without lockers or wardrobes, 8'-0" wide wall to wall
2. With wardrobes with no doors or non-projecting doors on one or both sides, 8'-0" wide face of wardrobe to face of opposite wall or face of wardrobe respectively
3. With lockers on one side, 8'-0" wide face of locker to face of opposite wall (assuming 12" lockers)
4. With lockers on two sides, 10'-0" wide face to face of lockers (assuming 12" lockers)

c. Corridor widths for large schools, particularly high schools, should be as wide as necessary for satisfactory circulation.

S103-3 Secondary Corridors

a. A secondary corridor is one which serves four or less classrooms, or not more than 150 pupils, exclusive of service areas. Consideration should be given to making these secondary corridors equal to the width of the main corridors for the addition of future classrooms.

b. Minimum clear width shall be 8'-0"

c. Secondary corridors are limited to 100'-0" and must terminate in an exit.

S103.4

a. [illegible] of [illegible] which is [illegible] very [illegible] according to the number of occupancy involved one shall have a minimum width of 44 inches.

S104 EXITS

S104-1 General (See Appendix M - Physically Handicapped)

a. There shall be at least two means of egress remote from each other leading from each floor of pupil occupancy for all school buildings so that, when a pupil enters into a corridor from a room of pupil occupancy, he shall have a choice of two unobstructed means of egress in different directions. See Exit, Appendix A.

b. Receiving areas cannot be used for exiting purposes.

c. During construction of building additions (and alterations), the required exits in the existing building must be kept clear and maintained.

d. Fixed and movable gates shall not be located so that they create deadend conditions for occupied spaces when the gates are in use. (Smoke-stop doors with panic hardware can generally be installed in lieu of gates to provide desired lockable administrative control, yet avoid deadend conditions beyond the doors.)

e. Building exits cannot discharge into completely enclosed courts.

f. Exiting through adjacent spaces other than corridors will not be allowed, unless specifically authorized.

g. Folding or rolling partitions and sliding or overhead doors are not to be considered as exits.

h. Required exits shall always be located remote from each other within a room or enclosed area. Exits shall be distributed as uniformly as possible along the perimeter of the room; as at diagonally opposite room corners.

i. See section 105, Door Hardware; 106, Doors.

S104-2 Places of Assembly Exits

a. A Place of Assembly is defined as any area for the assembly of 100 or more persons, and spaces over 1,800 square feet which are used for assembly occupancy of pupils; such as:

1. Auditoriums and Little Theaters (not including the front platform or stage)
2. Cafeterias
3. Courts - where so designed
4. Gymnasiums
5. Group Instruction Rooms
6. Music Rooms
7. Natatoriums having spectator space
8. Libraries generally will not be considered as places of assembly except where size and layout indicate otherwise.

S104-2

b. Requirements shall be generally in accord with the latest edition of the NFPA Life Safety Code (No.101) except as modified herein. Door exit widths shall be based on a 22" unit of width. Generally, it is not necessary to assume places of assembly and other instructional areas as being occupied simultaneously. For each 50 persons or fraction thereof one-half unit (11") of exit width shall be allocated. The number of exit units required shall be determined in the following manner:

(1) Auditorium:
$$\frac{\text{floor area}^*}{600} = \text{R.E.U.}^{**}$$

(2) Stage (including wings):
$$\frac{\text{floor area}^*}{1200} = \text{R.E.U.}^{**}$$

(3) Cafeteria:
$$\frac{\text{floor area}^*}{600} = \text{R.E.U.}^{**}$$

(4) Gymnasium:***
$$\frac{\text{bleacher area}^*}{250} \text{ plus } \frac{\text{remaining floor area}^*}{600} = \text{R.E.U.}^{**}$$

(5) Natatorium:
$$\frac{\text{bleacher area}^*}{250} \text{ plus } \frac{\text{remaining floor area}^*}{1500} = \text{R.E.U.}^{**}$$

c. No single exit doorway from places of assembly shall be less than 36 inches wide and whenever possible shall be a direct exit through an exterior wall. See S104-1.h.

d. Exit Units - The following table indicates the number of exit units allowed for each size door opening and stair width. (See S107-3) Where required Door Exit Units are served by stairs, the stair exit units required shall be determined by entering the table from the left. Stair Exit Units required by S107-3 shall be served by door exit units of at least those determined by entering the table from the right.

TABLE 104-2d

Door Exit Units	Nominal Width of Door Opening	Nominal Width of Stairs	Stair Exit Units
1½ (22" + 11")	36 inches	44 inches	2
2 (22" + 22")	44 "	55 "	2½
2½ (22"+22"+11")	56 "	66 "	3
3 etc.	66 "	88 "	4
3½	78 "	110 "	5
4	88 "	121 "	5½

*net floor area in square feet
**R.E.U. = required Door Exit Units
***where larger than normal size of facility results in substantial numbers of R.E.U., a reduction may be considered by the Division.

S104-2

e. Exit doors for places of assembly, which open into a corridor, shall open outwards in direction of travel, shall swing through 180° and leave a clear corridor width of 5'-0" while in their greatest projecting position; or, shall be fully recessed to leave a minimum clear corridor width as required in S103-2b.

f. When folding partitions are used to separate floor areas in any gymnasium, a pass door may be acceptable as one of the required exits from (only) one of the divided areas.

g. Stages over 500 square feet shall have remote exits. Interior doors from stages of 1000 square feet or more, and doors from work rooms and storage rooms which open on such stages shall be "B" label, self-closing fire doors.

h. Projection booths and rewinding rooms shall have a door at least 24" wide. Door shall be self-closing, "C" label opening outward in direction of travel.

S104-3 Auditorium Type Seating

a. Typical Seating

1. There shall be no more than 7 seats between any seat and a longitudinal aisle. (This is interpreted to allow a maximum of 15 seats between aisles.)

2. Minimum width of longitudinal aisles shall be at least the average required width throughout, based on a minimum aisle width at the front of the area of 36 inches with seats on both sides of the aisle, 30 inches with seats on only one side, with the aisle width increased at least 1/4 inch per foot of distance to the rear exits.

3. No more than 6 rows of seats may be served by a longitudinal aisle which is not relieved by an exit at each end. (i.e., a maximum 6 row deep dead end aisle is permissible.) Where a longitudinal aisle which is not relieved by an exit at each end serves 7 or more rows of seats, a cross aisle connecting to an exit must be provided at the unrelieved end of the longitudinal aisle.

4. Cross aisles shall be provided across the front of the first row of seats, and so that there are not more than 26 rows of seats between cross aisles. Cross aisles shall be of width at least equal to the widest aisle to which they connect or the width of the exit to which they connect.

S104.3 b. Minimum Spacing:

1. Back to back spacing of seats shall not be less than 33 inches, and

2. Minimum clear distance between a seat in the up position, in the case of self-rising seats, or tablet arm in the down position, and the plumb line of the back of the seat in front shall be 12 inches, or 16 inches with "continental" seating, or

3. Minimum clear distance between a seat in the down position, or tablet arm in the used position, and the plumb line of the back of the seat in front shall be 5½ inches, or 10 inches with "continental" seating.

c. "Continental" Seating:

1. The number of seats in a row is not limited where seats are the self-raising type and at least a 16 inch passage is provided between the seat in its lowered position and the horizontal projection to the seat in front.

2. Side aisles not less than 4'-0" width shall be provided, on which there are exit doors not more than 10'-0" apart. (For the purposes of this division, the 10'-0" shall be measured between adjacent jambs.)

S104-4 Courts

a. All courts which have their perimeters completely enclosed are considered to be potential areas of pupil occupancy.

b. Courts of less than 6,000 square feet shall have at least two exits, remote from each other, equipped with classroom function hardware operable FROM the court, with doors swinging in the direction of egress; except hardware from courts designed as a place of assembly shall be panic type operable from the court.

c. Courts of more than 6,000 square feet area shall be exited on the basis of one exit unit (E.E.U.) per 2,000 square feet with a usual maximum of six E.E.U. Exits shall be remote from each other and equipped with panic hardware operable FROM the court.

d. When security is a factor, an automatic alarm system can be installed.

S104-5 Space of Pupil Occupancy - WITH Traditional Corridor Concept:

a. All doors to corridors from spaces of pupil occupancy shall swing into the room unless fully recessed.

b. Class "A" or Class "B" Heavy Timber Construction (see Appendix, page A.2) - every space of pupil occupancy over 500 square feet area, shall have two separate means of egress from the space, each in a separate smoke zone. The primary exit is commonly the opening to the corridor. The second exit may be a door opening into a separate smoke zone; or, a door directly to the exterior; or, a window of such size and design that will facilitate egress; or, a door providing egress through adjacent spaces where specifically approved.

c. Class "B" and Class "C" Construction - every space of pupil occupancy shall have an exit to the corridor and, in addition, a door directly to the exterior.

d. No point in a space of pupil occupancy of less than 1,500 square feet shall exceed a 50 foot straight line distance to the opening to the corridor. Any additional exit(s) necessary to satisfy the 50 foot requirement shall be remote and, unless an emergency window is provided, into separate smoke zones. See S109-3.b.3.

e. Spaces of pupil occupancy over 1,500 square feet area shall have remotely located room exits into separate smoke zones, except that such exits may be into the same smoke zone if no point in the space exceeds a 50 foot straight line distance to an exit and an emergency window is provided. (With appropriate hardware, a pass door in an overhead garage type door can be approved as the second exit.) See S109-3.b.3.

f. Divided spaces: In rooms planned for division into two, or more, separate areas by means of folding or movable type partitions, each divided area shall have its own exits.

g. Self-contained rooms created by wardrobes, cabinetry, or other furniture which present obstructions to egress, rather than those created by traditional walls, partitions, and doors, must meet all the above criteria. Corridors must be provided, with applicable travel distances in corridors and rooms.

h. Escape Windows: See Section 104-7.

i. Smoke Zones: See Section 109-3.

S104-6 Space of Pupil Occupancy WITHOUT Corridor Concept

a. When spaces of pupil occupancy are defined in an open area by wardrobes, cabinetry, and other furniture which DO NOT present obstructions to egress and allow students to circulate freely from one space to another, the total open space can be considered, for exiting purposes, as a single space.

b. Each open-planned area shall have exits into separate smoke zones at remote locations. No point in such an open-planned area shall be more than a 75 foot straight line distance to an exit into a separate smoke zone. Corridor exitways, in the usual sense, are not required within the open-planned area; however, space for circulation of students needs to be provided for successful daily use.

c. Furniture layouts of all open-planned areas indicating the concept of free circulation must be submitted for review prior to approval of preliminary plans and submitted again with materials for final approval. Future operation within the open space must maintain the free circulation and location of movable cabinetry and furniture which would present obstructions to egress and restrict exiting shall be avoided.

d. Smoke Zones: See Section 109-3.

S104-7 Escape Windows

a. Emergency escape windows, as required in Section 104-5, shall be windows (and window hardware) of such size and design that will permit and facilitate emergency egress through them. It is recommended that all classroom windows permit emergency egress. (Double hung, casement, and sliding windows are satisfactory escape windows.)

b. The minimum clear opening area for such windows shall be at least 6 square feet. The minimum dimension shall be 24 inches unless otherwise approved.

c. School authorities shall cause at least one such window in each teaching area to be marked by an appropriate sign identifying the escape window.

S104-8 Miscellaneous Spaces

a. Any boiler room over 300 square feet in area shall have two exits remote from each other, one of which may be by means of a ladder or through an areaway. Outside doors should swing outward to relieve explosion pressures; inside doors shall swing into the boiler room.

b. Access to storage areas for gasoline powered equipment cannot be directly from the school, but must be through an outside door.

S105 DOOR HARDWARE

S105-1 Door Hardware for Classrooms and Other Spaces of Pupil Occupancy

a. Hardware on doors from spaces of pupil occupancy shall be a type which will always permit the door to be opened from the inside without direct manipulation of any type locking device.

S105-2 Panic Hardware

a. All exterior and interior exit doors in exitways and from all places of assembly shall have panic hardware, except:

1. All exterior corridor doors shall have panic hardware, except those serving only one or two classrooms, or service areas (such as a boiler room, kitchen, or storage room) may have hardware in accord with S105-1.

2. Panic hardware is not required for push-pull interior doors from places of assembly and exitways if these doors have non-latching hardware.

S105-3 Hardware Specifications

a. Hardware specifications should include a general definitive statement which describes the type of hardware to be used on doors from spaces of pupil occupancy, from places of assembly, and exit doors to assure compliance with S105-1 and S105-2.

b. Cash allowance type hardware specifications shall include such a statement.

S106 DOORS

S106-1 Exit Doors and Doorways

a. All doors that require panic hardware swing in the direction of egress - Exterior doors that do not require panic hardware may swing in. See S105.

b. Permanent or removable mullions on pairs of doors are recommended.

S106-2 Door Sizes

a. No door from a space of pupil occupancy nor a single exit door shall be less than 32 inches in width nor more than 44 inches in width unless specifically approved. Each leaf of a pair of doors (i.e.no mullion) shall not be less than 24 inches nor more than 44 inches in width unless specifically approved.

b. Minimum door size from places of assembly - see S104-2c.

c. Main corridors should terminate with at least 2-36" exterior doors.

S106-3 Fire Doors

The following requirements for labeled doors pertain only to interior doors leading from the spaces mentioned: (see S202-6)

a. "B LABEL" self-closing doors and frames

1. Boiler or heater rooms (See S104-8);Incinerator rooms
2. Fuel storage and flammable liquid storage
3. Refrigeration, air conditioning, mechanical equipment rooms
4. Transformer vaults
5. Stages (See S104-2g)
6. Basements
   a) Storage rooms
   b) Building service and maintenance areas - recommended
   c) Openings from basements and other lower level areas to ground or first floor above

b. "C LABEL" self-closing doors and frames

1. Projection booths (See S104-2h)
2. Stairway enclosures - recommended - See S109-2 & 4
3. Smoke stops - recommended - See S109-4
4. Building service and maintenance areas (other than basements) opening on exitways - recommended

c. All fire doors required above shall be maintained in a normally closed position and shall not be secured in an open position. Fusible links are not permitted.

S107 STAIRWAYS

S107-1 General

a. There shall be at least two means of egress remote from each other from each floor having pupil occupancy, including basements.

b. All stairways shall be enclosed with fire resistive materials and closed off at each floor to prevent passage of smoke and fumes through the stairway opening. See S109.

c. Stairs exiting down and continuing down past the exit shall be interrupted by appropriate means at the top of the run to the lower level.

d. There shall be no storage space under any stairs or landings.

S107-2 Encroachment of Stairs

a. Stairs are permitted to encroach on the minimum width of corridors at exit level only if a clear passage of such width required to serve exit level exits and at least 66" is provided to the exit doors. (These exit doors shall provide at least 3 door exit units.)

S107-3 Width of Stairs

a. One unit of stair width equals 22 inches. Partial units of stair width are not countable in determining required width except that a ½ stair unit increment of 11" is permitted.

b. One unit of stair width shall be provided for: (see Table 104.2.d)

1. Top story: each 3,300 square feet or fraction thereof of gross area

2. Intermediate stories: each 2,400 square feet or fraction thereof of gross area

c. Stair widths shall be maintained clear and unobstructed throughout the entire length of the stairway. See handrail exceptions - S107-4.

S107-3.c

1. Two unit (44" wide) stairs are minimum for exit stairs. Stairs wider than 44" should be considered to improve circulation.

2. A door into a stairway shall at no point in its swing reduce the effective width of the stair to less than 22", nor when fully open interfere with full use of the stair.

d. Stairways serving places of assembly: see Table 104.2d.

S107-4 Handrails

a. Continuous handrails shall be provided on both sides of stairways. For 88 inches (or more) wide stairways, center handrails shall be provided.

b. Height of handrails above and in line with risers shall be 2'-5" to 2'-8" varying up depending on the age of the pupils.

c. Handrails may project not more than 3½" at each side within the required stair width, and at least one handrail per run should extend at least 18" beyond the top and bottom risers to provide for the physically handicapped.

S107-5 Railings (Balustrades, Guardrails)

a. If railings are made up of spaced bars, etc. (rather than a solid screen), the spacing shall be such as to prevent anyone from falling between them.

b. Height of balustrades for both interior and exterior stairs shall be 3'-6" above tread nosings, and 3'-6" minimum above landing floors.

S107-6 Rise/Run

a. Each stairway from story to story shall be in two or more runs with not more than 16 risers, nor less than 3 risers, per run; except that a straight run of stairs without any intermediate landing may be used for differences in floor elevations not exceeding seven feet. This does not apply to secondary or service stairs.

b. Maximum riser - 7½".

c. Minimum tread (including nosing) - 10½".

d. The product obtained by multiplying height of riser by width of tread shall be not less than 65.

(Note: Stairs with non-abrupt (not square) projecting nosings will accommodate the physically handicapped.)

S107-7 Landings

a. Intermediate landings between runs shall be at least 44 inches.

b. Terminal landings of at least 44 inches shall be provided at the top and bottom of a run of stairs for each floor level. Such landings shall not encroach upon the width of any through corridors.

S107-8 Construction

a. All stairs and stairwells shall be built throughout of fire resistive materials. Handrails are exempt from this requirement.

b. Stair treads, risers, and landings shall be solid without perforations.

c. The nosings of all stairway treads and landings shall be constructed to provide non-slip surfaces. Contrasting colors are recommended when nosing and tread are of different materials; and the construction must provide a smooth and level tread surface.

S107-9 Secondary Stairways and Service Stairs

a. Secondary stairs are those stairs from spaces which are not required exits from the spaces.

b. Service stairs are those stairs not intended for pupil use.

c. Secondary stairs and service stairs may be less than 44 inches, but shall comply with requirements for main stairways in regard to fire resistiveness and, generally, in all other respects.

S107-10 Corridor Stairs

a. Full-width corridor stairs separating changes of level within a corridor length shall have the top and/or bottom riser no closer to an intersecting corridor than 44 inches.

S107-11 Exterior Steps

a. Exterior steps of more than three risers leading directly from a building exit, shall be provided with protection from any accumulation of snow and ice. In the case of main entrance stairs, roofs or canopies may be satisfactory in lieu of enclosures if the specific design (number of risers, location, and size of exit facility) are all found to be acceptable. Protection may not be required where accumulations of ice and snow would be removed in the normal operation of the building.

S107-11 b. Exterior steps shall have an easy rake (Riser 6", Tread 11" or better) to compensate for the hazard of ice and snow.

S107-12 Winders

a. Stairways for pupil use may not be constructed with winders. Exceptions may be made for secondary stairways serving special areas which have limited use, such as projection booths, observatories, etc.

S107-13 Fire Escapes

a. Fire escapes are not permitted on new school buildings. (On existing school buildings fire escapes of approved design shall be installed when other exits are determined to be inadequate for fire safety.) See Appendix H.

S108 RAMPS AND AISLES

a. Ramp slope shall not exceed a pitch of 1 in 12. Ramp surfaces and surfaces of auditorium aisles and other spaces having sloped floors shall be non-slip.

b. Ramps connecting floor levels shall be enclosed. See S109.

c. Ramps shall conform generally to requirements of stairways, S107, regarding widths, landings, and handrails.

S109 SMOKE CONTROL

S109-1 General

a. Every floor of a building shall be separated from floor levels above and below by stair enclosures and smoke barriers constructed to effectively obstruct the passage of smoke and fumes.

b. Every space of pupil occupancy over 500 square feet area, including open-planned areas, must have (at least) two means of egress, each in a separate smoke zone. When such spaces do not have ready access to the building exterior, separate smoke zones shall be created by construction of smoke barriers to effectively obstruct the passage of smoke and fumes.

S109-2 Stairway Enclosures

a. All stairways shall be fully enclosed with fire resistive materials, and closed off at each floor by doors, to effectively obstruct the passage of smoke and fumes through the stairwell opening, except that:

1. with communicating secondary stairs in a two-story room with the same use on both floors, (such as a library with mezzanine) stairs may be unenclosed and the floor to floor separation achieved at the perimeter of the room on one level.

2. in buildings having three or more stairways serving corridors and building exits, one stairway may be unenclosed at the grade level.

b. Distance to exits:

1. At the grade level, the stairway enclosure door or bottom riser of an approved unenclosed stair shall be within 50 feet along the line of travel of an exterior (not vestibule) door. It is recommended that all stairs exit directly to the outside and the Commissioner may require that particular stairs do exit directly to the outside.

2. Stairways serving three or more floors shall exit directly to the outside.

c. No doors shall be permitted into stair enclosures except from corridors; and, where specifically approved, doors required for exit access.

d. The distance from the stair enclosure of one exit stairway to the stair enclosure of another exit stairway shall not exceed 240 feet along the line of travel. Distance from enclosure door opening to the first stair riser shall not be more than 10 feet except where specifically approved. Stair enclosure doors shall be at least 5 feet away from a door to a room having pupil occupancy.

e. See S109-4, Doors - Stair Enclosures and Smoke Zones.

S109-3 Smoke Zones (smoke barriers, smoke stops)

a. Smoke barriers required to divide a building into separate smoke zones shall be constructed of fire resistive materials of such design and detail to effectively obstruct the passage of smoke and fumes.

S109-3 b. Location of Smoke Barriers:

1. Buildings in which all spaces of pupil occupancy have access to usually accepted secondary means of exit into separate smoke zones (such as access to the exterior through escape windows) will generally not require smoke barriers, other than for separation of major building elements.

2. Smoke barriers are required to create separate smoke zones for spaces of pupil occupancy which would not have usually accepted exits into separate smoke zones, interior spaces of pupil occupancy and interior courts required for exiting (i.e., with escape windows to the court).

3. Smoke barriers and smoke zones may not be required where one of the required means of exit is directly related to an exterior door, stair enclosure, approved protected exit passageway, or other approved smoke zone.

4. Interior places of assembly not having approximately one-half of the required exit units within 50 feet of exterior doors, require smoke stops located so that approximately one-half of the required exit units are into separate smoke zones.

5. Major building elements of a total building complex shall be separated into individual smoke zones. Approximately 30,000 square feet will be used as a guideline - not necessarily a maximum.

6. Open-planned (undivided) areas shall be restricted in size, using approximately 30,000 square feet as a guideline - not necessarily a maximum. See S103-1e & S106.

7. Smoke stops can generally be located at intersections of corridors to provide the desired separation and with door swings which avoid deadend pocket conditions.

8. Extent and continuity of smoke barriers must be designated on preliminary plans and indicated, again, on drawings submitted for final approval so that the completeness and integrity of a smoke zone can be determined.

9. See Section 109-4, Doors - Stair Enclosures and Smoke Zones.

S109-4 Doors - Stair Enclosures and Smoke Barriers

a. Doors, sidelights, and frames for stair enclosures and in smoke barriers shall be constructed of fire resistive materials of such design to effectively obstruct the passage of smoke and fumes. See Section 106-3 for fire doors.

b. Doors shall be metal, metal covered, approved treated wood construction, or solid bonded core wood doors not less than 1 3/4 inches thick. They shall be self-closing and shall close the opening completely with only such clearance as is necessary for proper operation.

1. Glazing in doors, sidelights, and frames shall be 1/4 inch wireglass, U. L. approved.

2. Doors shall swing in the direction of egress with no latching or locking devices unless operated by panic hardware. Double-acting hinged doors are not permitted and corridor pockets opposing swing of doors shall not exceed a depth of 1½ times pocket width.

3. It is required that stairway enclosures, and recommended that smoke barriers, continue to the underside of construction above. A 3/4 hour fire resistance rating, with "C" label fire rated openings is recommended.

c. Automatic Door Release: Approved automatic release devices, whereby upon interruption of an electrical circuit the door is released and becomes self-closing, shall be provided on stair enclosure doors, and doors in corridors and from places of assembly which are in smoke barriers.

1. The electric circuit shall be positively interrupted by activation of the building fire alarm, which may incorporate an approved smoke detection system.

2. Door closers which incorporate an integral hold-open feature are not permitted.

d. Fusible links shall not be used to hold doors open.

e. Doors at teaching area type spaces which are in smoke barriers shall be self-closing and maintained in a normally closed position and shall bear a sign on each side in at least 2 inch high letters reading, "Smoke Door--Keep Closed" (unless held open by an automatic door release).

1. See Section 109-4b, & 4b.1.

S110 FIRE CONTROL

S110-1 Fire Protection Equipment

a. Fire extinguishers shall bear the Underwriters Label and shall be set in recesses flush with the corridor wall just above the base at such locations that no point in the corridor, lobby, or stairs shall be more than 120 feet from an extinguisher.

b. Fire extinguishers shall also be placed convenient to the stage of the auditorium, in shops, homemaking rooms, chemistry labs, kitchens, boiler and incinerator rooms, and in other places which can be considered a probable source of fire.

c. Fire extinguishers shall be of the type most suitable for the kind of fire expected in an area.

d. If hydrants of a municipal water system are available, standard fire hydrant facilities shall be installed in accordance with S404.

e. Sprinklers shall be installed on the stage of all auditoriums using fly scenery.

S110-2 Additions

a. It is recommended that additions be separated from existing nonfire-resistive buildings and connected only by fire-resistive passages with self-closing fire doors between the old and the new units.

S110-3 Building Location

a. The location of a building should be such that fire apparatus can serve all points of the building.

S110-4 Firestopping

a. Concealed spaces within wall, partition, floor, or stair construction shall be firestopped, or filled with noncombustible material to prevent the passage of flame, smoke, fumes, and hot gases.

S110-5 Projection Booths

a. Automatic fire shutters capable of manual operation shall be provided for all operating and observation openings in booths where other than "safety" film is used.

S110-6 Stage Storage

a. Storage of scenery and equipment in space underneath the stage is not recommended.

S110-7 Fire Blankets

a. Fire blankets for smothering clothing fires should be available in all areas where students are exposed to the hazards of any equipment having an open flame.

S111 PROVIDING FOR THE PHYSICALLY HANDICAPPED

a. Starting with the preliminary design stage, consideration shall be given to the needs of the physically handicapped persons who may be using the building. The building should be designed so that they have easy access to it, and so that, once inside, they can move about and use the facilities as readily as those without handicaps. (See Appendix M).

S112 ACCIDENT PROTECTION

S112-1 Window Cleaning Safety Devices

a. Persons engaged in window cleaning shall be protected. Windows shall be cleaned from approved safe surfaces, window sills or ledges, ladders, boatswains' chairs, or scaffolds, all as defined in 12-NYCRR-21.

b. A safe surface is where the cleaner is working not over 6 feet off the floor (or grade) and not over 3 feet above a stair run.

c. Ladders may be used generally when the top of the window is not over 35 feet above grade (or floor).

d. Window sills and ledges may be used when the window openings are provided with approved anchors for use with safety belts.

e. Approved boatswains' chairs and scaffold also may be used.

S112-2 Shower Room Areas

a. Shower rooms shall be designed to prevent water from being tracked into locker rooms. Where possible, curbs should be eliminated by proper location of drains.

b. Consideration should be given to the installation of grab bars in shower rooms. These may be in combination with soap holders if soap dispensers are not installed.

PART II

MATERIALS

S201 GENERAL

a. Selection of all materials and finishes shall be made with consideration for assuring fire safe conditions, first costs, economical and efficient operation and maintenance, and consideration of favorable fire insurance rates.

S202 INTERIOR FINISH

a. Interior finishes are materials applied directly to walls, fixed or movable partitions, ceilings, and exposed interior surfaces of a building, etc., as well as the exposed finish of construction materials. Such finishes may provide decorative treatments and visual environment (see Part III), sound control (see S206), thermal insulation (see S207), and sanitation. In all cases, interior finishes must be selected to reduce contribution to propagation of fire.

S202-1 Fire Hazard Classification

a. The Fire Hazard Classification of a finish material provides data in regard to flame spread, fuel contributed, and smoke developed. Interior finish materials shall be classified in accordance with the recognized standard test in which asbestos cement board rates 0 on a scale and red oak lumber, 100. ASTM E-84, NFPA-255, UL-793.

   1. Class A Finish - flame spread 0-25; Any material classified at 25 or less, and any element thereof which, when so tested, shall not continue to propagate fire.

   2. Class B Finish - flame spread 25-75.

   3. Class C Finish - flame spread 75-200.

   4. Class D Finish - flame spread 200-500.

b. Combustion produces smoke, acrid fumes, toxic products, carbon monoxide, and oxygen deficiency, as well as heat and flame. Carbon monoxide and oxygen deficiency present the greatest life hazard, although lethal concentrations of toxic products may occur. The chief hazard of smoke is reduced visibility; however, the psychological, panic-producing factor of a smoke-filled area cannot be overlooked.

S202-1 c. Regardless of the flame spread classification, no material having a smoke developed rating of 450 or more shall be used, and any material having a life hazard greater than that indicated by the flame spread classification because of the amount and character of combustion products generated, shall be included in a lesser classification appropriate to its actual hazard, as determined by the Commissioner.

S202-2 Limitation of Use of Interior Finishes

a. Interior finishes include, but are not limited to veneer, wainscotting, paneling, and plastic wall coverings. For the purpose of this manual paint finishes, paper and wood veneers not more than 1/28 inch thick (.035"), trim less than 6 inches in width, solid bonded core wood doors, and floors are not deemed to be interior finish.

b. Interior finish in school construction shall be Class A, B, or C, except as set forth below. (Class D interior finish shall not be used in school construction.)

c. Class C interior finish shall not be used in school construction of more than three stories.

d. Class A or B interior finish shall be used in the following locations:

1. Corridors, passageways, and stairways. (exitways)
2. Kitchens.
3. Storerooms. See S202-6-b for basement storerooms.
4. Maintenance and repair areas and custodial spaces.
5. Places of Assembly and Stages, except wainscots not over 8 feet above floor may be Class C.

S202-3 Attachment of Interior Finish

a. Interior finish shall be fastened or cemented in place so as to not be readily loosened when subjected to a room temperature of 400°F for 30 minutes.

b. Interior finish 1/8" or less in thickness shall be applied directly to fire resistive base construction, such as walls, or to fire resistive backing applied as in "c" below.

c. Interior finish shall be applied directly to fire resistive base construction, such as walls, or to wood furring strips of not over 1 3/4" nominal thickness fastened to fire resistive base construction. The furred space between finish and base material shall be filled with fire resistive material or fire stopped at least 10 feet on center in both directions.

Note: Wood and plywood paneling may be used when applied to fire resistive base construction as above providing the fire hazard classification is as herein specified.

S202-4 Sanitary Interior Finishes

a. Food storage, preparation, and serving areas, toilet rooms, shower, and locker rooms, and similar areas shall have appropriate non-absorbent, impervious floor and wall surfaces which will facilitate cleaning.

b. In such areas which are subject to water spillage and flush type cleaning, attention must be given to the provision of, and location of floor drains.

S202-5 Curtains and Draperies

a. The board of education and architect shall be responsible to ascertain that all curtains, fittings, and draperies are fire resistive or flame retardant, whether included in the principal contracts or purchased later as equipment. The board shall maintain and renew safety treatments as required.

S202-6 Fire Retardant Paint

a. Fire retardant paint shall not be used as a means of protecting combustible assemblies where fire resistive materials or assemblies are required.

b. Fire retardant paint may be used to produce required flame spread classifications on approved assemblies.

S203 FIRE RESISTANT (RATED) CONSTRUCTION (See S104-8 and S106-3)

a. Walls, floors, and ceilings of the following spaces shall be of construction having at least the fire resistance ratings listed below, with non-combustible finish. Those spaces having a roof over the entire space may have roof construction (and ceiling) of non-rated fire resistive materials.

b. Two (2) hour construction:

1. Boiler or heater rooms, incinerator rooms
2. Fuel, flammable liquid, or gas powered equipment storage
3. Refrigeration, air conditioning, or mechanical equipment rooms
4. Transformer vaults
5. Stages (excluding proscenium opening) over 1,000 square feet
6. Basement storage areas
7. Separation of basement and other lower level areas from floors above - recommended

c. One (1) hour construction:

1. Projection rooms
2. Stairway enclosures and smoke stops - recommended
3. Building service and maintenance areas - recommended

S204 HAZARDOUS GLASS (GLAZED) AREAS

S204-1 Glazed Panels and Doors

a. Safety glazing is required in the following locations in normally occupied areas, unless railings or grilles are provided which will provide comparable protection from accidents due to physical contact:

1. All glazing within 18 inches of the floor (or platform level of music room-type risers), and additionally,

2. All glazing within 48 inches of the floor in corridor walls, including classroom doors, exit doors and sidelights.

3. All glazing in areas where educational use may cause physical abuse, such as gymnasiums and playrooms.

b. Acceptable safety glazing materials shall be at least ¼" thick wire glass, ¼" tempered (heat treated) glass, ¼" laminated safety glass, or approved plastic materials.

S204-2 Marking of Glazed Doors and Sidelights

a. Glazed doors and sidelights within 6 feet of such doors shall be marked by appropriate means in accord with 12.NYCRR.47, except marking on door and/or sidelight is not required:

1. Where less than 80% of the area of the door or sidelight above a reference line 18 inches above the floor is glazed

2. Where width of sidelight is not more than 20 inches, with 1 3/4 inch minimum opaque stiles

3. Where floor treatment out 3 feet from a sidelight will deter approach (pools, planters, etc.)

4. Where sidelights are supported on 18 inch minimum height opaque sill and wall construction

5. Where sidelights are protected by approved 18 inch minimum height permanent barriers extending across at least two-thirds of the sidelight (benches, planters, guardrails, etc.).

S205 PLASTICS

S205-1 General

a. Plastic materials are commonly used in building construction. Many existing test procedures have been disputed as not being indicative of the reaction of a given material to actual fire conditions. Plastics are organic and must be considered as combustible. The industry is improving the characteristics of plastics under fire conditions and there are on-going studies of development of improved testing programs. Until such time as new tests are developed and accepted, plastic materials for public school construction shall meet the tests indicated in this section.

b. Where specific standards are not set forth below, they shall conform to minimum accepted standards established by the Commissioner.

S205-2 Specifications for Plastics

a. Where plastic materials are incorporated into construction, the plans and specifications shall require that each type plastic material meet the specific tests indicated in the following sections. Plans and specifications not meeting this criteria will not be approved.

b. Any plastic material failing to meet the indicated tests shall not be used.

S205-3 Limitations of Use

a. Until such time as newer tests are developed and accepted, plastic materials shall meet the test criteria indicated in the following sections. Additional testing in accord with procedures prescribed by the Commissioner may be required when the behavior of a plastic material or assembly under fire conditions remains questionable.

b. No plastic material shall be used which has a smoke developed rating of 450 or more when tested in accordance with ASTM E-84, or a smoke density rating of 75 or more when tested in accordance with ASTM D-2843.

c. Plastic materials shall meet the following test criteria in accordance with Table 205-3, on page 2.11.

1. ASTM E-84, Surface Burning Characteristics of Building Materials: flame spread rating shall not exceed 0-25; smoke developed rating shall not exceed 450.

2. ASTM D-635, Flammability of Self-Supporting Plastics: burning test shall not exceed 1.5 inches per minute.

S205-3

3. ASTM D-1929, Ignition Properties of Plastics: self-ignition shall not occur below 600°F.

4. ASTM E-108, Fire Tests of Roof Coverings: material shall pass the Class A burning brand test.

5. ASTM D-648, Deflection Temperature of Plastics Under Flexural Load: materials shall remain in place 15 minutes at 175°F. and fall from frame at 200° below ignition temperature.

6. ASTM D-2843, Standard Method for Measuring Density of Smoke from Burning or Decomposition of Plastics: smoke density shall not exceed 75.

S205-4 Interior Finish and Trim--Plastic

a. Plastic materials for interior finish and trim shall be in accordance with Section S202.

S205-5 Insulation--Plastic

a. Plastic insulation materials shall be in accordance with Section S207.

S205-6 Glazing With Plastics

a. Doors, sash and framed openings may be glazed with light transmitting plastic materials, where such openings are not required to be fire-rated and do not form required smoke barriers, when in accordance with the following limitations:

1. Maximum area of uninterrupted plane surface of the wall face of the story in which installed.....50%

2. Maximum area of a single pane of glazing.....12 sq. ft.

3. Maximum height of a single pane of glazing.....4 feet

4. Maximum area of a combination of plastic assemblies, i.e., glazing and/or wall panels.....500 sq. ft.

S205-6

5. Minimum separation with fire resistive materials of #4 above, and vertically between floors.....4 feet

6. Where extensive plastic glazing is used relative to the wall area of a single room, interior smoke venting may be required.

b. Plastic materials used for glazing shall meet the following tests. See S205-3c.

1. ASTM D-635
2. ASTM D-1929
3. ASTM E-84 re: smoke developed; or D-2843

c. Interior plastic glazing shall be in conformance with Section S202.

d. Plastic glazing (which may reduce glass breakage) is generally subject to scarring from physical abuse and burning. Also, high impact acrylics may create entry and venting difficulties for fire fighters. The use of such plastic glazing should be considered only where it is determined to be practical.

S205-7 Wall Panels--Plastic

a. Exterior plastic wall panels of a single sheet or an assembly of sheets, used as light transmitting media or as surface veneer, may be installed when in accordance with the following limitations:

1. Maximum area of uninterrupted plane surface of the wall face of the story in which installed.....50%

2. Maximum area of a combination of plastic assemblies, i.e., glazing and/or wall panels.....500 sq.ft.

3. Minimum separation with fire resistive material of #2 above and vertically between floors.....4 feet

4. Where extensive plastic panels are used relative to the wall area of a single room, interior smoke venting may be required.

S205-7 b. Plastic materials used for wall panels shall meet the following tests. See S205-3c.

1. ASTM D-635
2. ASTM D-1929
3. ASTM E-84 re: smoke developed; or D-2843

c. Interior plastic wall panels shall be in conformance with Section S202.

S205-8 Roof Panels--Plastic

a. Roof panels of a single sheet or an assembly of sheets of light transmitting plastic materials may be installed when in accordance with the following limitations.

1. Maximum area of individual plastic assembly.....200 sq. ft.

2. Maximum aggregate area of plastic assemblies of area of room below.....25%

3. Minimum separation of assemblies.....4 feet

4. Where roof panels incorporate smoke venting which will open upon activation of smoke detection devices interconnected to sound the internal fire alarm system, the area limitations of #1 and #2 above do not apply.

b. Plastic materials used for roof panels shall meet the following tests. See S205-3c.

1. ASTM E-84 (interior exposure)
2. ASTM E-108 (exterior exposure)
3. ASTM D-1929

S205-9 Skylights--Plastic

a. Domed skylight units, and related ceiling panels of light transmitting plastic materials may be installed when in accordance with the following limitations.

1. Exterior dome profile shall rise above the mounting flange a minimum of 10% of the maximum span, but not less than 5 inches.

2. Maximum area of individual plastic assembly..... 200 sq. ft.

S205-9

3. Maximum aggregate area of plastic assemblies of area of room below.....25%

4. Minimum separation of assemblies.....4 feet

5. Minimum curb height.....6 inches

6. Where skylights incorporate smoke venting which will open upon activation of smoke detection devices interconnected to sound the internal fire alarm system, the area limitations of #2 and #3 above do not apply.

b. Plastic materials for skylights shall meet the following tests. See S205-3c.

1. ASTM D-635
2. ASTM E-84 Re: smoke developed or D-2843.

c. Interior ceiling panels shall be in conformance with Section S202.

S205-10 Light Diffusing Ceiling Systems

a. Light diffusing ceiling systems and lighting fixture diffusers of light transmitting plastics which meet the following tests, may be used. See S205-3c.

1. ASTM D-635
2. ASTM D-648 - only when aggregate area of plastic exceeds 30% of the ceiling area of the room.
3. ASTM E-84 or D-2843 re: smoke developed.

S205-11 Greenhouse-Type Enclosures--Plastic

a. Plastic materials for greenhouse-type or swimming pool enclosures may be installed when in accordance with the following limitations.

1. Wall materials shall conform to S205-7b.

2. Roof materials shall meet the following tests. See S205-3c.

ASTM E-84 (interior exposure)
ASTM E-108 (exterior exposure)
ASTM D-1929

S205-11

3. Where the roof assembly incorporates smoke venting which will open upon activation of smoke detection devices interconnected to sound the internal fire alarm system, flame spread in accordance with ASTM E-84 is not required. Conformance regarding smoke in accordance with ASTM E-84 or D-2843 is required.

b. Such enclosures shall not occur directly adjacent to, or below fresh air or window openings in the main building and shall be separated from the main building by 1½ hour fire rated construction with 1½ Class B doors.

S205-12 Awnings, Canopies--Plastic

a. Plastic materials for exterior assemblies such as awnings and canopies (other than at fire escapes) may be used without limitation, provided that such assemblies do not occur immediately adjacent to or below fresh air or window openings in the main building.

S205-13 Speciality Items, Furnishings--Plastic

a. Plastic speciality items (such as waste baskets, tote trays and foam rubber athletic landing mats) and plastic furniture (such as shelving, desks and bean-bag chairs) are combustible; some dangerously so. They add substantially, and many times needlessly, to the fire load of a building.

b. Flammability, fuel contribution and smoke considerations must be carefully investigated during the selection of such speciality items and furnishings. Fire test criteria and test results should be required of the manufacturers prior to purchase and items of obvious and questionable hazard avoided.

TABLE 205-3

TESTS FOR PLASTICS

	ASTM E84				ASTM D2843	ASTM D635	ASTM D648	ASTM D1929	ASTM E108
	0-25 flame spread	25-75 flame spread	fuel contribution not over 100	smoke developed not over 450	smoke density not over 75	burning rate not over 2.5 inches	remain in place 15 min. @ 175°F. and fail @ 200°F. below ignition temp.	self-ignition temp. not over 600°F.	class A burning brand
Ceiling Systems				X	X	X	X		
Ducts	X			50					
Furniture and Specialities	*			*	*			*	
Glazing				X	X	X		X	
Insulation: Building	X	X	X	X	X				
Pipe/Duct	X			X	X				
Roof panels	X			X	X			X	X
Skylights				X	X	X			
Wall panels				X	X	X		X	

* recommended

S206 SOUND CONTROL MATERIALS

S206-1 General

a. Sound control in school buildings is important and necessary. It is more than just the "removal of noise". Acoustic materials, properly used, can control and reinforce desired sounds and provide quality hearing conditions in a given space. Unwanted external sounds can be suppressed and diverted. The production and transmission of unwanted internal sounds can be minimized and controlled.

b. Special acoustical considerations are necessary in such spaces as music rooms, auditoriums, gymnasiums, natatoriums, cafeterias, corridors, special purpose teaching areas, open-planned teaching areas where relocatable partition systems are used, and in mechanical systems. In such cases, acoustic engineering service is advisable.

S206-2 Acoustic Materials

a. Acoustic materials shall be inherently noncombustible materials such as glass fiber, acoustic plaster, mineral board, mineral wool, and perforated metal.

1. Combustible cellulose (wood or cane fiber) tile shall not be used, except that such tile having an integral fire retardant and 0-25 flame spread may be used.

b. Surface finishes and membranes of acoustic materials and tile, and wrappings--such as kraft paper--of acoustic batts and blankets shall provide the fire hazard classifications required by S202-2.

S206-3 Carpeting

a. Carpeting is effective in controlling the production of sound. Its use for this purpose should be considered. See S208.

S207 THERMAL INSULATION

S207-1 General

a. Use of thermal insulation is essential in school buildings; not only to contribute to a suitable thermal environment in the various areas, but equally important, to reduce energy consumption and aid with efficient utilization of energy resources.

b. Insulation materials should provide maximum insulating values consistent with a value analysis of initial installation costs and long-term reduction of operating costs.

S207-2 Insulation Materials

a. Insulation materials for rigid and semi-rigid composition board and fiber board, and for blankets, batts, and pellets, including surfaces and wrappings, shall be UL listed and have a flame spread of not over 75 in accordance with ASTM E-84. See S202-1.

b. Expanded Plastic Foam: Plastic foam insulation materials must be considered very combustible and existing test procedures are not necessarily indicative of a material under actual fire conditions. Plastic foam insulation materials may be used which are UL listed and have a flame spread of not over 75, and fuel contributed of not over 100 in accordance with ASTM E-84. Such materials shall be completely covered, including edges, by inherently non-combustible materials.

1. Section S205-1, -2 and -3 apply to this section.

S208 FLOORS AND FLOOR COVERING

S208-1 General

a. Floors present large exposed areas of interior finish; however, experience with actual fires throughout the country generally does not indicate a serious life hazard due to flame spread on floor surfaces. Floor coverings must, however, be considered in regard to their contribution to fuel load of a given area and any material or finish which creates an obvious fire hazard must be avoided.

S208-2 Floor Finishes

a. Finishes on floors shall minimize the possibility of slipping. Consideration must be given to high traffic and high activity areas such as corridors and stairs, gymnasiums, and places of assembly, as well as potential wet areas such as shower, drying, and locker rooms, swimming pool decks, toilets, kitchens, and entrances.

S208-3 Floor Covering

a. Carpeting, manufactured of many natural or synthetic products and numerous combinations, is available. Increasingly, carpeting and backings are evaluated with regard to fire safety. Caution must be exercised in the purchase of a particular type with consideration and some guarantees from the manufacturers regarding limitation and control of flammability and smoke propagation, not only of the carpet, but also the backing. Until more appropriate tests are developed, carpet and backing must meet the methenamine pill test,(ASTM D-2859, DOC-FF1-70.)

PART III

VISUAL ENVIRONMENT

S301 GENERAL

a. Visual environment of a facility is a prime element in the learning process. To be successful, it must be the careful blending and balancing of many factors. The various visual tasks, fenestration, natural and artificial light, brightness, glare, room proportions, wall colors and finishes, and furnishings are some of what must be considered.

b. Adequate levels of illumination--which may be a combination of artificial and natural light--shall be provided, consistent with efficient energy utilization, for the various visual tasks being performed in each area of the facility.

1. See S803 and Table S803-1 for artificial lighting requirements.

S302 BRIGHTNESS DIFFERENCES

a. Visual comfort depends not only upon ample light (foot candles) but also upon reasonably low brightness difference between various surfaces within the visual field.

b. A high brightness difference, or contrast, between the particular object being viewed and its immediate background is desirable. Examples are: the difference in brightness between printed words and the page on which they are printed; and, the difference between the thread and the cloth on which the stitching is done. High brightness differences within the remainder of the visual field should be limited. Examples are: book and desk; or book and walls or ceiling; or light sources viewed against adjacent surfaces.

c. Brightness ratios should meet the criteria of Table S302.

S303 WINDOW DESIGN AND ARRANGEMENT

S303-1 General

a. To provide a comfortable feeling for the room occupants and to provide eye relief through a substantial change in focusing distance, each room used by students must be designed to allow a view to the exterior (not just sky), in accordance with Table S303.

TABLE S302

RECOMMENDED LIMITS OF BRIGHTNESS RATIOS

Between	Ratio
a. Central Visual Field (the task) and immediately adjacent surfaces, such as between task and desk top, the task being the brighter surface	3:1
b. Central Visual Field (the task) and the more remote darker surfaces in the Surrounding Visual Field, such as between task and floor	10:1
c. Central Visual Field (the task) and the more remote brighter surfaces in the Surrounding Visual Field, such as between task and ceiling	1:10
d. Surfaces in the Surrounding Visual Field and adjacent luminaires or windows	1:20

S303-2 Window Requirements

a. Vision strips shall be provided in accordance with Table S303.

1. Length of vision strip shall be at least 50% of the lineal length of an outside wall of the room, and

2. Head of windows shall be at least 72 inches (6'-0") above the floor, and

3. Stool (interior sill) height of windows shall not exceed 32, 44, or 60 inches in accordance with Table S303.

b. Exceptions to the requirements of Table S303 may be granted if it can be shown by written application, that the educational program warrants an exception. In such cases, one or more fixtures in an area may be required to be continuously "on", wired from the exit light circuit.

S303-3 Separation of Window Walls

a. Distance between walls having classroom windows shall be such as to enable a substantial change in eye focusing distance. The minimum separation shall be 30 feet; however, distance in excess of this is recommended.

b. Walls of non-teaching spaces having windows (and walls with no windows) shall have a usual minimum separation of 15 feet.

TABLE S303

WINDOW REQUIREMENTS

Space	Max. Stool Height (Inches)	Vision Strip Reqd.	Vision Strip Recom'd.	Daylight Required	Daylight Recom'd.	Daylight Not Reqd.
Administration	--				X	X
Art & Drawing	40	X				
Audio Visual	--					X
Auditorium	--					X
Boiler Room	--				X	X
Business						
Distributive Ed.	32				X	X
Sec. & Office Prac.	32	X				
Typing	32	X				
Cafeteria	--		X	X		
Classrooms						
Academic(Secondary)	32	X				
Elementary	32*	X				
Conference	--		X		X	X
Corridors	--			X		
Guidance	--		X		X	X
Gymnasium	--			X	Skylights	
Health	--				X	X
Homemaking	40	X				
Incinerator Room	--					X
Kitchen			X		Skylights Clerestory	X
Lg. Group Instr.						X

*30 inches recommended

TABLE S303-3
CONTINUED

Space	Max. Stool Height (Inches)	Vision Strip Reqd.	Vision Strip Recom'd.	Daylight Required	Daylight Recom'd.	Daylight Not Reqd.
Library-up to 2000 sqft	44	X				
Library-over 2000 sqft	--		X		X	X
Office & Workroom	--				X	X
Conference	--				X	X
Music						
Elementary	32	X				
Junior H. S.	32		X	X		
Jr.-Sr. & Sr. H.S.	40		X	X		
Pantry, Serving	--				X	X
Pupil Activity	--				X	X
Science Rms. (All)	40	X				
Shops						
Agriculture	60	X				
Ag. Recitation	40	X				
General	60	X				
Vocational	60	X				
Shower & Locker Rm.	--			X	skylights clerestory	
Stairways, Pupil	--			X		
Store Room	--				X	X
Study Hall	32	X				
Swimming Pool	--			X	skylights clerestory	
Teachers Room	--				X	X
Television Studio	--					X
Toilets	--				X	X

§303-4 Window Arrangement

a. Classroom orientation may be in any direction; however, east and west orientation is preferred, particularly for elementary schools.

b. Glazed areas should be placed and arranged to minimize brightness differences. Direct view of the sky or of bright exterior surfaces produces glare and should be avoided.

c. Glare can be controlled by:

1. Limiting of window height
2. Use of tinted glass
3. Extension of roof overhangs
4. Installation of venetian blinds or drapes
5. Use of foliage

§304 SKYLIGHTS

§304-1 Location

a. Skylights may be used to provide natural light in those spaces where a vision strip is not mandatory but natural light is required.

§304-2 Materials - See Section §205-9.

§305 CLASSROOM PROPORTIONS

§305-1 General

a. Rooms shall be properly proportioned for intended use. In general, it is recommended that the short side of any room intended primarily for classroom or similar use be not less than two-thirds of the longer side. Since the windows are intended for view to the exterior, the maximum distance from the glazing to the most distant point within the room should be such as to permit view to the exterior by the room occupants. Forty feet is a suggested maximum.

§305-2 Ceiling Heights

a. The ceiling heights of classrooms and similar areas measured from the floor to the principal plane of the ceiling shall not be less than nine feet.

b. Ceiling height of other spaces shall be properly proportioned to the size of the room, and as required by special considerations, with 7'-6" minimum. Note that low ceilings are generally more susceptible to physical abuse.

S306 **INTERIOR FINISH**

a. Color and finish of walls, ceilings, floors, and even furnishings and equipment provide an important contribution to a pleasing and efficient visual environment.

b. Flat or mat-finish high reflectance surfaces not only provide better visual quality, but also improve the efficiency of the lighting system. Bright, glossy surface finishes reflect light sharply and are sources of undesirable glare. Such glossy surfaces should be avoided, particularly below eye level.

c. See Interior finish, S202.

PART IV

SITE AND UTILITIES

S401 GENERAL

a. Among the many essential educational and architectural factors in the determination and selection of a site are those of suitability, location, environment, elevations, contours, soil conditions, costs as well as availability of the necessary utilities and services. Freedom from disturbing noises, obnoxious odors, and traffic hazards and provisions for health and safety conditions are also necessary considerations.

b. Exposures to various facilities involving existing or proposed electric, gas and liquid fuel transmission, and distribution lines shall be limited within safe distances (See S409, 410, 411).

c. Sites should generally be selected where municipal water supplies are available or where conditions for well water are known to be favorable.

d. The availability of municipal sewer disposal systems is a distinct advantage in the selection of a school site. However, where municipal sewer districts do not exist, soil conditions and the availability to absorb sewage effluents are great factors for consideration in site selection and operation.

e. Considerations of availability of fire department facilities and their fire department reporting systems must be investigated.

f. Security systems such as exterior lighting against vandalism and electric card-key building exit devices should be incorporated into the design of school site and building. Police surveillance and available communication systems in an area may be desirable assets in the determination of a site.

g. Reference should be made to Educational Facilities Planning publication, "School Site Standards, Site Selection and Site Development", to determine the safety criteria and requirements that must be applied to the site and for the building during the planning and design phases.

S402 EFFICIENT UTILIZATION OF ENERGY AND SITE SELECTION

a. Site selection must anticipate the correlation of the future building with site features including natural topography, existing trees, and orientation to sun and prevailing winds. In the energy-wasting past buildings have often ignored their natural environment and have compensated for this oversight by relying almost completely upon artificial lighting and mechanical means of heating and ventilation.

S402 b. The practicable orientation of the proposed building must consider the following:

1. Natural lighting can be utilized in a manner to minimize the continuous use of many of the artificial lighting circuits in a school, particularly those on the perimeter. Adequate control of such natural lighting is important, both as to the quality of daylight admitted, and the amount of solar heat to be admitted into the building, or shielded from it, dependent upon outside temperatures. The quality of natural light depends upon sun location, diffusion by trees, natural and artificial obstructions in the surrounding terrain, and whether such light is admitted directly through windows and skylights or reflected through such openings from the underside of overhangs or from reflective ground surfaces.

2. Solar heat gain into the building through glazed areas, as well as solar heat absorbed by the walls and roof of the structure which eventually radiates into the building interior, must be calculated to efficiently utilize such energy at those periods heating of the building is required, and minimized at those times when the building can be overheated as the result of such solar gain. Note that outside air intake into the ventilation system is not required when the building is on heating cycle, but can be introduced in increasing quantities as the building overheats. Consider the possible future use of solar collectors, with proper orientation for collector mounting and space for water storage tanks.

3. Insulation, and reduced cold air infiltration from winter prevailing winds, is aided when windows are minimized on the northerly exposures and such walls are heavily insulated. Location of the building on the site may be such as to permit locating rooms not requiring daylight on the northerly exposures.

4. Natural ventilation of a building is affected by the air flow resulting from the prevailing wind path over the natural terrain and existing obstructions of the site. The exposure to air flow will affect the air infiltration through the building shell, during the heating season; however, maximum natural ventilation is desirable during spring and fall seasons.

8403 **STANDARDS OF CONSTRUCTION AND CODES**

a. Generally the standards of construction for site and building are those contained within this Manual. Cooperation and coordination with other planning agencies, municipalities, and counties should be planned in the selection of a site and in the determination of accessibility, entrances, and exits onto roads and highways. Land fills and locations of unfavorable industrial and other environmental detrimental areas should be avoided. Existing trees and pleasant landscaping should be preserved to maintain the beauty and enhance the environment of the school and locality.

b. Municipal and state codes generally do not apply to schoolhouse construction or to the site, but may be applied to supplement the construction and mechanical requirements stated herein. It is intended that cooperation and communication be maintained with municipalities and state agencies to coordinate various efforts of good design.

c. The site and construction requirements of the local public utility companies shall be applied to the sites serving the potential site, together with the requirements within this Manual. The rules and regulations of the Public Service Commission with respect to gas, electrical, and petroleum transmission and distribution lines apply to the placement and installation of such lines near school buildings. Similarly, the placement of a school building near existing transmission and distribution lines must necessarily meet the same requirements of the Public Service Commission.

d. All underground pipes and conduits, regardless of their contents, shall be protected from corresion and shall be provided with sleeves at the foundation wall and shall be sealed at the section of entry into the building with a material that will form a gas-proof barrier.

8404 **WATER SUPPLY**

a. No source of water shall be utilized without the approval of the State Health Department through their appropriate District Office or County or City Health Department. Connection for water supply source shall be made to existing lines of nearby water districts or municipal water systems wherever possible.

b. Water supplies for schools must be adequate, safe, and palatable. There shall be an abundance of water available at all times for present and future expanded needs, at least 30 gallons per pupil per day for all purposes. The water must be safe for use as determined by state or local health authorities and must be maintained safe by protection of the source of supply by necessary treatment and by frequent analysis. For drinking purposes, water must be reasonably free of sulphur, magnesium, or similar natural minerals which render the water unpalatable.

S404

b. Pipings and fittings used in water distribution systems must be non-toxic materials which will not affect the condition of the water as to health, odor, or taste. Plastic pipe must bear the seal of the approval for potable water of the National Sanitation Foundation(NSF).

c. Standard fire hydrant facilities shall be installed where a municipal water supply is available at location(s)which will allow 500-foot length(s)of fire hose to come within effective quenching range of any fire around the perimeter of the building. Conversely, hydrants should not be located within 50 feet of the building for accessibility and for good utilization. Investigation of existing water pressures and possible coverage should be made with local municipal water district officials and fire department officials. To obtain better fire insurance rates from fire insurance rating organizations, a minimum water flow of 500 gallons per minute should be provided by the municipal water district. Actually, flows of higher capacities may be required for some buildings in order to provide adequate fire protection. A loop or grid system of water flow should be provided wherever the mains are available.

d. Prior to acquiring a site for a school building, boards of education and their architect or engineer should consult with the appropriate county, city, or state district health agency in a preliminary review to determine if the prospective sites can provide adequate water facilities.

S405 SWIMMING POOLS

a. Installations of swimming pools as part of the physical education program require certificates of construction by the Department of Health. Therefore, it is necessary to submit applications for approval to the local agency of the Health Department early during the design stage in order to receive swimming pool approval prior to the submission of building construction plans and specifications to the Commissioner of Education for review and for approval.

b. See S704-3b.

S406 AIR POLLUTION

a. Approval of the Department of Environmental Conservation is required on the control of air pollution under the public health law, and rules and regulations as promulgated by the Air Pollution Control Board. For submission of plans and specifications to the local office, Department of Environmental Conservation for air pollution control, see Appendix E. Such applications for air pollution approval should be submitted to the Department of Environmental Conservation prior to or soon after submission of final plans and specifications for construction to the Commissioner of Education for his review and approval.

S406 b. Heating plants of more than one million BTU's rated input capacity using fuels other than gas, incinerators, or other installations capable of polluting the atmosphere must have the approval of the Department of Environmental Conservation. (See Appendix E).

S407 SEWAGE DISPOSAL

a. Municipal sewage disposal systems are preferred for interconnection of a school building. Privately owned sewage disposal systems have been approved and accepted for interconnection with the school building; however, the Department of Environmental Conservation and this Division want assurances of perpetual availability and service of such systems. Where the site is adaptable and suitable, drain tile fields, cesspools, sand filter beds, and packaged treatment plants are acceptable to the Department of Environmental Conservation and to this Division. Prior to the acquiring of a site for a school building, boards of education and their architect and engineer should consult the appropriate County, City, or State Environmental Conservation Agency, in a preliminary review to determine if the proposed sites are adaptable to provide adequate sanitary facilities.

b. Plans for school sewage disposal systems should be based upon reasonable future requirements as well as present needs. Sewage connections to existing or nearby sewer districts or municipal systems shall be made wherever possible. If no such system is available, an independent system must be designed, including septic tanks, filter beds, or leaching fields or cesspools. Plans and specifications for independent sewage disposal systems shall be presented to the office of the appropriate local agency of the Department of Environmental Conservation at least 60 days prior to the date of desired approval. Approval for final plans and specifications for sewage disposal must be obtained from the local agency of the Department of Environmental Conservation or their appropriate District Office. The services of the local public sanitary engineer should be sought in the early preparation of plans in order that the plans when completed will be acceptable to the Department of Environmental Conservation.

c. Normally the design for school septic systems is based upon a minimum of 15 gallons per pupil of flow per day without showers and 20 gallons per pupil per day with showers.

d. Roof leaders must not be drained into independent school sewage disposal systems and must be conveyed independently to separate systems, ditches, streams, or other available outlets. Investigations of availability of municipal storm systems must be made prior to design.

S408 STORM DRAINAGE AND ACCESSIBILITY FOR SCHOOL SITES

a. Effective storm drainage of the school site and building and proper entrances and exits of the school site shall be planned and indicated on the plans and specifications submitted to the Commissioner of Education for approval. The appropriate superintendent or commissioner of highways shall also be advised of the location of all temporary and permanent entrances and exits upon a public highway and the storm drainage plan to be used.

S409 GAS TRANSMISSION AND DISTRIBUTION LINES AND EQUIPMENT

a. Placement of gas transmission and distribution lines within certain distances of school buildings is regulated by the Public Service Commission Codes, Rules and Regulations NYCRR Part 255 and by the Federal Department of Transportation, Part 192 which is contained in the Appendix to this Manual. Conversely, school buildings must not be located within certain distances of existing gas lines unless such gas lines have met the requirements of the Public Service Commission and Federal Department of Transportation for the placement of school buildings and the installation standards of the American National Standards Institute. (See Appendix B Accepted Standards.)

b. Outside shut-off valves to shut off the supply of gas shall be installed and located for ready accessibility in case of emergency.

c. Pressure regulating and overpressure protection devices located outside the school building shall be enclosed in a cabinet, gas house, cubicle, areaway, vault, pit or fenced outside areas of durable structural materials which will withstand any loads to which they may be subjected. When pressure regulating and overpressure protection devices are located in a separate room within the building walls, construction of this room shall be of two-hour fire resistant, masonry concrete construction throughout (walls and floor) and sealed to the concrete slab ceiling or roof construction. This area shall be accessible only through an outside opening, where practical, shall be well ventilated, and shall have adequate space and protection from falling objects for both equipment and piping.

d. Gas service pressure regulators and overpressure relief valves shall also be suitably vented into the outside atmosphere at sufficient height to prevent hazardous conditions to children and the surrounding area.

e. See S710, Part VII, Plumbing and Gas Facilities.

S410 ELECTRICAL TRANSMISSION AND DISTRIBUTION

a. Electrical lines must not extend overhead across any useable portion of the site or where they would present a hazard to the children. They should follow property lines; however, distribution service lines may extend along driveways onto the site. It is preferred that service lines be installed underground wherever possible.

S411 LIQUID PETROLEUM TRANSMISSION AND DISTRIBUTION

a. It is most desirable not to have liquid petroleum pipelines on school owned property; however, pipelines may extend along property lines if the building can be located sufficiently distant to prevent hazardous conditions. Piping must be placed away from traffic patterns of vehicles or else must be adequately protected by casements or other structural methods. These pipelines as constructed for the operating pipeline companies must meet the requirements of the American National Standards Institute (ANSI B30.4). Forthcoming rules and regulations of the New York State Public Service Commission must be applied in the placement, location, construction, operating conditions, maintenance programs, and other limitations.

PART V

MECHANICAL AND ELECTRICAL PLANNING

S501 GENERAL

a. General Provisions, Sections S1 through S14 also apply to this Part.

b. A school building must provide for the health, comfort, and safety of children, teachers, and other occupants. No mechanical equipment or construction materials shall be used, nor any type of construction permitted, which will endanger the health, safety, or comfort of all occupants in the school building.

c. It is strongly recommended that the school board authorize engineering studies of any new building program by an engineer, in conjunction with the architect, to determine all practical steps that can be taken in the building design to most efficiently utilize the energy that will be consumed. Selection of equipment, and method of its use, should be made on a basis of Life-Cycle Costing. Heat recovery systems should be utilized wherever possible. Discretion must be used in the selection of any mechanical system; the efficient utilization of energy in one particular system may have complementary, or contradictory, effects on other systems of the same building, and, therefore, require alternative selections.

S502 AVAILABLE SERVICE

a. At the outset of a building program an investigation must be made with regard to the available fuels, electrical service, water supply, and sewage disposal facilities which are available or for which provision will have to be made.

b. The selection of the energy for heating and of heating mediums and systems must be made with economic considerations for owning and operation of the systems, as well as for their relative efficient use of energy.

S503 PROTECTION OF PIPING

a. At the section of entry into a school building, all underground pipes and conduits, regardless of their purpose, shall be protected against corrosion, shall be provided with sleeves, and shall be sealed with a material which will form a gas-proof barrier.

S504 EQUIPMENT IDENTIFICATION

a. All heating, ventilating, air conditioning, and electrical equipment and their controllers shall be labeled and tagged for quick identification.

b. All piping and valves shall also be marked and identified as to direction of flows and type of flows within piping in accordance with ANSI 13.1. (See Appendix B, Accepted Standards).

S505 INSTRUCTIONS

a. The mechanical and electrical specifications shall require that trade contractors or their representatives shall instruct the Board of Education or their representatives in the proper operation and service of all mechanical and electrical equipment at the time of completion and before acceptance of the school building.

b. An Operation Manual shall be provided by the Mechanical and Electrical Engineers. This manual shall explain in general the type of mechanical and electrical systems that have been provided; the function of heating, ventilating, and air conditioning systems, the intent of the temperature control systems, operation of boilers or furnaces; the provisions of the electrical systems with regard to the functions of the fire alarm and detection system, exit light system, emergency lighting and the distribution systems for lighting, power, and communications; and the necessary maintenance for electrical equipment and fans, air handling systems and individual items of heating and equipment which will be necessary to maintain the building.

c. Provision shall be made for initial start-up and operation of the mechanical and electrical systems by the contractor[s] in the presence of the architect or engineer, the owner's representative, with the assistance of the necessary factory trained mechanics, and public utility representatives as required for the various systems.

S506 YEARLY INSPECTION

a. Boards of education shall make provision for at least yearly inspection of all mechanical, electrical, and automatic equipment and flame safeguard controls for burners and boilers by competent personnel or by control service contracts to make sure that the systems operate properly and efficiently.

S507 STANDARDS

a. All mechanical and electrical devices and equipment and packaged equipment shall meet the standards and bear the label of recognized testing agencies, such as the Underwriters Laboratories. As minimum standards, the boiler-burner installations shall meet the minimum requirements of the Underwriters Laboratory; or the more stringent standards of the Factory Insurance Association or Factory Mutual Association should be considered.

b. Generally, all mechanical and electrical installations shall meet the requirements of the American National Standards Institute(ANSI) and National Fire Protection Association(NFPA).

c. All major items of kitchen equipment shall be selected for sanitary operation and maintenance and shall bear the seal of National Sanitation Foundation(NSF).

d. Fire dampers shall be provided and installed in fire walls and enclosures and between floor levels in accordance with NFPA-90A. Fire wall construction is provided generally in boiler rooms, heater rooms, kitchen exhaust hoods, roof-top mounted units, and between floor levels. Openings in fire resistive ventilation shafts and stairwells must also be provided with fire dampers. All fire dampers shall be shown on the plans. Smoke detectors may be used in return plenum of roof-top mounted units in lieu of fire dampers.

e. Smoke dampers shall be provided in smoke partitions which may be required to extend to the roof deck or to the ceiling slab.

S508 MECHANICAL REQUIREMENTS OF SPECIAL AREAS

a. In the early stages of design, a study should be made of the educational program to determine special mechanical and electrical requirements in various areas, such as the large group instruction, auditorium-study halls, audio-visual, vocational, music, science, homemaking center, and art center classrooms, and in the cafeteria, kitchen, and equipment drying room. In these areas special ventilation or air exhausting, special temperature controls, special temperature zoning, special plumbing fixtures, special gas and air piping, special power provisions, and special lighting needs may be required to achieve a satisfactory design.

b. Special attention must be given to such factors as electrical "demand" loads (as created by welding shops and swimming pool heaters) to achieve an energy efficient building package.

S509 AIR POLLUTION

a. See S406 and Appendix E, Advancement of Plans.

S510 AS BUILT DRAWINGS AND VALVE IDENTIFICATION

a. Mechanical "as built" drawings shall be provided to the owner for heating, ventilating, and air conditioning diagrams, plumbing diagrams, electrical diagrams for power and light, fire alarm systems, exit light systems, emergency light systems and other when installations differ from the engineer's original drawings.

b. "As built" drawings shall be provided to the owner on burner primary controls, boiler controls, temperature and pressure controls, piping, power wiring, and all equipment in boiler room.

S511 BALANCING OF MECHANICAL AND ELECTRICAL SYSTEMS

a. Responsibility for balancing of mechanical and electrical systems should be clarified within the specifications. Either the mechanical or electrical contractor, a separate balancing contractor, or in some instances the experienced engineer himself should be specified as the responsible party who shall balance the mechanical and electrical systems to perform and function within the design criteria.

S512 MACHINERY GUARDS

a. Adequate guards shall be provided on all moving parts of mechanical and electrical equipment such as belts, pulleys, couplings which may be a safety hazard.

S513 NOISE LEVELS

a. Mechanical and electrical equipment shall be selected so that there is no noise interference with communication or intended use in any place of pupil occupancy. Noise levels in all other areas shall be maintained at acceptable levels with consideration given to the intended use of such space.

PART VI

HEATING, VENTILATING, AND AIR-CONDITIONING REQUIREMENTS

S601 PERFORMANCE STANDARDS

a. General Provisions Section 1 through S15 also apply to this Part.

b. These standards are performance standards. The Commissioner of Education has been given wide, discretionary powers in the approval of specifications for heating and ventilating and air-conditioning. Any type of system which meets these minimum standards will be considered for approval. However, simplicity of design with detailed attention to the efficient use of energy, and ease of maintenance, shall be considered which will provide an effective system at economical cost. Consider the possibility of adding solar heat collectors in the future.

S602 HEATING

S602-1 General

a. All heating and cooling generating equipment, accessories, and controls and their installation shall be tested to insure safe operation and shall bear the seal of approval of a national testing agency as the Underwriters Laboratory for minimum standards of construction and installation; all pressure vessels shall bear the seal of the ASME Boiler and Pressure Vessel Codes.

S602-2 Boilers and Boiler Pressures

a. Only low pressure boilers shall be installed in school buildings. Such boilers shall produce steam or vapor at a pressure of 15 pounds per square inch gauge (psig) or less, or hot water at a pressure not exceeding 160 pounds per square inch gauge (psig), and at a temperature not exceeding 250 degrees Fahrenheit.

b. High pressure boilers may be installed in a centralized heating plant. The centralized heating plant shall be a separate facility and shall not be part of a school building. Heat exchangers shall then be installed in the school building to provide a low pressure distribution system throughout the building.

c. Boilers which are used for vocational instructional purposes shall meet all the equipment and control requirements as for conventional heating equipment used in boiler rooms. High pressure boilers as used in dry-cleaning processes shall be installed in separate rooms, as is required for conventional heating equipment.

S602-3 Fuel Burning Equipment

a. Fuel burning equipment in boilers, furnaces, and domestic hot water heaters having an input over 400,000 BTU per hour per combustion chamber shall be listed and bear the seal of approval of a national testing agency such as the Underwriters Laboratories Inc. or American Gas Association Laboratories. This requirement for U.L. or A.G.A. listing shall also apply to all controls and accessories that are necessary to insure safe operation. Fuel burning equipment shall also meet the minimum inspection requirements of Codes, Rules and Regulations of the State of New York, NYCRR, Code Rule 4 and Code Rule 14 where applicable. Further, the intent is to encourage the incorporation of new devices and controls, as they are developed and accepted, into the control system of the boiler-burner and heating system. Where applicable, to a particular heating system, the fuel burning equipment shall include the following:

1. Automatic electronic flame safeguard controls shall automatically de-energize the electrical circuit to the main fuel valves within 4 seconds upon flame failure. The de-energized valve shall automatically close within the next 5 seconds. (See S602-3c.8).

2. The trial for ignition period for the pilot on automatically fired boilers and furnaces shall not exceed 15 seconds. Also, the trial for ignition of the main burner shall not exceed 15 seconds.

3. The burner and boiler shall be installed with adequate controls to provide the following functions and interlocks as may be necessary on the individual design:

   a. Air flow supervision to the combustion chamber.

   b. Pre-ignition purging of the combustion chamber.

   c. Proven start and supervision of induced draft and forced draft fan operation.

   d. Proven low-fire start on inputs over 1,000,000 BTU per hour.

   e. Shut-down on low oil temperature and low oil pressure.

f. Non-recycling safety shut-down or upper limit gas pressure or low limit gas pressure.

g. Proving fuel valve in closed position for burners on boilers over 250 BHP.

h. All flame supervisory and programming control units should include a self-checking circuit. This self-checking must be performed at least once on each ignition cycle. It would be preferred if the flame detector and programmer checked itself continuously and periodically during operation to assure safe equipment conditions during prolonged firing periods.

i. High limit manual reset operating control of heating medium. This additional limit control shall not be installed on a common sampling tube with the operative limit control.

j. High pressure limit control for steam; high temperature limit control for warm air and hot water.

k. Low water cut-off control and low water feeders and auxiliary low water cut-off with manual reset. Low water cut-off may be of the float type. The auxiliary low water cut-off manual reset may be of the probe type.

l. Necessary operational controls for safe operation of boilers.

m. An alarm system to signal burner failure and shut-down in response to item h, this section.

n. Air supply for combustion:

   1. Sufficient fresh air shall be provided to the heat generating apparatus to allow complete combustion of fuel at all firing rates.

2. For gas or oil power burners the boiler room shall have at least one square foot of free opening area for the entry of fresh air for every 2,000,000 BTU of fuel burned per hour. For gas equipment with draft hoods, the boiler room shall have at least one square foot of free opening area for every 720,000 BTU of fuel burned per hour.

3. The opening for fresh air combustion should terminate in the boiler room near the floor level. It should be kept free and clear at all times.

4. In addition to air required for combustion, sufficient air shall be supplied for ventilation; including all air required for comfort and proper working conditions for personnel. The opening shall be covered with 1/4 inch mesh screen and terminate in the boiler room near the floor level.

o. Observation ports shall be provided for visually observing the pilot and main flame.

p. Testing and initial check-out of the burner, boiler, and related fuel burning equipment controls shall be performed by the manufacturer's representatives.

b. Fuel burning equipment in boilers, furnaces, and domestic hot water heaters having an input under 400,000 BTU per hour per combustion controls shall bear the approval of a national testing agency such as the Underwriters Laboratories, Inc., (U.L.) or the American Gas Association Laboratories (AGA), for the entire package of boilers, furnaces, domestic hot water heaters, and their fuel burning equipment and safety controls.

c. The following general boiler room provisions must be provided:

1. Gas piping, including the boiler or furnace gas train, shall be in accord with the rules and regulations of the public utility and in accordance with the appropriate ANSI Codes (Z21.33, Z21.30, Z83.1, Z95.1).

S602-3

2. A manual fuel shut-off valve on the supply main which is accessible for emergency use.

3. ASME approved safety relief valves of adequate capacity and size for the pressure vessel.

4. Operational tests for all fuel and distribution piping and start-up tests for burners and boilers and furnaces and boiler room equipment. (See S505c.)

5. Adequate space and arrangements for removal and replacement of boiler tubes.

6. Owners representative to be provided with a set of instructions of operation of the boilers and burners. A compiled list of equipment and motors in the boiler room with catalog numbers and instructions for maintenance must be provided. (See S505a.)

7. Emergency break glass station at boiler room entrance or entrances (inside or outside of boiler room) to de-energize the primary control circuit and to close the main fuel valves and shut down the fuel pumps to stop the flow of fuel through the burner during an emergency.

8. The electrical supply to the control system shall be 120 volts AC with one line grounded. High voltage and low voltage wires shall be run in separate conduit. Conductors for flame sensor or detectors for safety controls shall also be run in separate conduit. Conductors shall be color coded as follows:

   black - hot
   white - neutral
   green - ground

9. Mechanical exhaust and atmospheric type flues shall be in accordance with ANSI Z21.30.

S603 DIRECT FIRED HEATING UNITS

a. Direct fired heating units such as self-contained heaters or heating and ventilating furnaces, regardless of fuel used, shall not be installed in any place of pupil occupancy. All direct fired heaters shall be located within fire resistive spaces having at least two-hour fire rated construction and such spaces must have fire dampers in the walls where walls are pierced.

b. Roof mounted direct fired units with open type electrical heating elements and furnace combustion areas may be used when installed in accord with the following criteria.

S603.b

1. The structural integrity of the roof deck must be maintained within the curb(s) supporting the unit by fire resistive material - something other than the integral bottom of the unit, i.e., metal roof deck, metal pan, structural slab, etc.

2. A ceiling of inherently non-combustible material must be installed in areas below the unit and below duct work from the unit.

3. Automatic smoke detection must be installed in the return air duct(s)to the unit, interconnected with the unit and fire alarm system so that detection of smoke will shut off the main supply of fuel or energy and sound the building fire alarm system. (See S807-3.)

c. Electric Heating Requirements. (See S802.)

S604 BOILER ROOM VENTILATION AND COMBUSTION AIR

a. Heater and boiler rooms shall be provided with permanent louvered openings, or with motor operated dampers interconnected with the burner operation, to insure an adequate supply of combustion air. Gravity ventilation should be provided as necessary to reduce heat build-up in the space. Forced ventilation for heater and boiler rooms is required if the space above the room is occupied. Wherever spaces exist above the boiler room, then the ceiling must be made fire-resistive, providing at least a 2 hour rating and shall be insulated to prevent heat transfer. Caution should be used so as not to cause the Boiler Room to operate at a negative air pressure, which can cause hazardous and explosive reactions. (See S602-3a3.)

b. Air handling units located in boiler rooms shall be furnished with seals and locks on access doors to prevent natural gases, fumes, and exhaust gases from being drawn into the units and distributed throughout the building. Such units should be located in mechanical equipment rooms other than boiler rooms.

c. Duct work passing through,and openings in interior walls, floors, and ceilings of boiler rooms shall be provided with at least 1½ hour rated fire dampers. (See S507-d.)

S605 TEMPERATURE CONTROLS

a. A temperature control system that is best suited to provide the thermal environment shall be provided for the intended use. These controls should be the simplest controls to perform the intended function.

S605 b. Temperature Control Panels should be located so as to be under the supervision of the building supervisor, either in the custodian's office, mechanical equipment room, or in a central area. Such panels should not be located in the Boiler Room.

c. Control systems shall be arranged and cycled to provide the conditions described for heating, ventilation and/or mechanical cooling as described in S606. Advantage should be taken of natural "free" cooling whenever outdoor temperatures will allow provision for favorable indoor conditions. Occupied-unoccupied setbacks should also be provided to allow for more economic operation of the building and for the most efficient utilization of energy.

d. For proper performance and economy, systems for heating, ventilating, and air-conditioning are sufficiently complicated to require automatic controls. Maintenance programs or service contracts are essential to cause these to function and operate so as to result in a satisfactory thermal environment.

S606 THERMAL ENVIRONMENT

S606-1 General

a. Architects, engineers, boards of education and educators must have common understanding, at the outset of a building program, of the design criteria selected, and of the thermal environment that can be attained from such criteria. The efficient use of energy for the operation of the heating, ventilating, and mechanical cooling systems may mean that at certain infrequent outside temperatures the interior thermal environment may be other than optimum. See S606-2d and S606-5a.

b. Schools are occupied during the warmer hours of the day, and, due to the metabolic heat released by occupants, the heat of lighting, and solar gain, there is a build-up of heat. It has been demonstrated that schools normally require cooling most of the day, even when outside temperatures are below freezing. This condition is even more prevalent in interior spaces.

c. Infiltration, sometimes greater than 0.5 air changes per hour, occurs naturally through windows, doors and other areas of air leakage of a building which is not under positive pressure. To this must be added the purges brought about by exterior doors being opened for passage of the entire school population at least twice daily, plus unavoidable air leakage through ventilation equipment.

S606-1

d. Energy is more efficiently used in heating, ventilating, and mechanical cooling systems when outside air introduced by such systems does not have to be heated. Also, when inside temperatures rise, it is desirable to introduce increasing quantities of outside air to provide natural cooling without the use of mechanical cooling equipment. Auxiliary forms of ventilation such as operable windows, louver intakes, and supplemental mechanical exhausters must be considered in addition to ventilation supplied from basic units.

e. Select heating, ventilating, and cooling equipment as close as practicable to calculated loads.

f. It is strongly recommended that heat recovery devices be provided for all significant exhaust air systems.

g. Fiberglas ducts shall bear the Class 1 U.L. label and be used according to NFPA 90A.

h. Motors operating fans in central and multizone air handling systems and exhaust systems, having fan capacities of greater than 1000 cfm,(see 807-1)shall be interconnected to the fire alarm system to shut down such motors when the fire alarm is activated. It is recommended that single unit ventilators serving individual rooms, and exhaust fans of 1000 cfm capacity and less, also be so connected.

S606-2 <u>Heating</u>

a. Heating and ventilating systems shall be so designed that when properly installed and operated during the heating season they will produce the room temperature, scheduled in Table S606-2. Systems shall include automatic night setback control cycles.

b. Maximum air temperature gradient from floor to 60" above floor shall not exceed 5^{o}.

c. Air motion in zones of occupancy shall not cause discomfort of occupants, due to hot or cold air movements. Air shall be introduced in such manner to prevent pockets of stagnant air.

d. Heat losses may be calculated on outside winter conditions in the 97½% column of Guide Tables on Weather Data and Design Conditions, ASHRAE Handbook of Fundamentals. (See S606-1a.)

TABLE S606-2

Minimum Room Temperatures *

(degrees F. dry bulb)

Type of Space	Temperature Range
Sedentary activities	
Classrooms, Auditoriums, Offices Cafeterias	66° - 70°
Moderate activities	
Shops, Laboratories, Kitchens	66° - 68°
Vigorous activities	
Gymnasiums, Playrooms	64° - 66°
Locker Rooms	70° - 72°
Shower Rooms	74° - 76°
Swimming Pool Area	78° - 80°

* Consistent with efficient utilization of energy resources, these ranges of temperature account for varying types of activity and appropriate dress. The upper range is more applicable to elementary; the lower to secondary.

S606-3 Ventilating

a. Teaching areas, libraries, and places of assembly such as cafeterias, gymnasiums, large-group-instruction rooms, and auditoriums shall be provided with mechanical ventilation of at least 10 cfm per occupant of outside air when the outside temperature is 35°F. and above. No fixed minimum of outside air is required below 35°F. During ventilation and cooling cycle, supply, return, and exhaust air handling equipment shall provide for variable introduction of outdoor air, from 0% to 100% fan capacity, with proportionate increases of exhaust air and decreases in return air. During heating cycles, a warm-up cycle may provide no outside air until the room thermostat is satisfied. Systems requiring quantities of cold air to be heated to an acceptable discharge temperature during a cooling cycle shall be avoided.

S606-3 b. Interior spaces of pupil occupancy which are approved because of educational program shall be provided with equipment for mechanical cooling when natural cooling provided by outdoor air cannot maintain a temperature of 74°F. in the spaces. See S606-5g.

c. Classrooms may be vented into corridors. Ceiling spaces over corridors may serve as plenums for exhausting classrooms; however, when such spaces are used as plenums, the plenum must be of fire-resistive construction.

S606-4 Special Ventilation

a. Special ventilating equipment, entirely independent of the ventilating system(s) serving the balance of the building, shall be provided in areas where odors are likely to be strong, where fumes or dust are common, where overheating is likely to occur, and as necessary to avoid concentrations of toxic fumes. Provide separate make-up air systems to all fume hoods wherever practicable, preferably using air recirculated from other portions of the building; however, if make-up air must be taken from the outside, temper such air sufficiently to avoid condensation in hoods. Consider heat recovery devices.

b. Recommended minimum ventilation quantities for special areas are:

1. Locker and shower rooms...1 cfm per square foot floor area
2. Toilets.....2 cfm per square foot floor area
3. Kitchen - dishwashing
   3 sided hood.....100 cfm per square foot area
   4 sided hood.....150 cfm per square foot area

c. Cafeteria-Kitchens

1. Hoods with mechanical exhaust shall be installed over steam kettles, dishwashers, ranges, deep fat fryers, and other heavy-duty appliances.

2. Removable grease filters shall be provided in kitchen ductwork with adequate clearance from ends of flues or appliance vent to grease filter. Provision for inspection and cleaning must be provided.

S606-4

3. Fire dampers must be provided in ducts from main kitchen exhaust hoods which extend horizontally through other spaces or which extend vertically through floors. For such arrangements, automatic extinguishing systems are recommended and fire dampers can be omitted where permissible, due to type of extinguishing system. Fire dampers may be omitted where exhaust is directly to the outside.

4. Kitchen supply ventilation may be taken from cafeteria exhaust when the kitchen is under negative pressure; however, consideration must be given to the reduction of the transmission of noise between rooms.

d. Locker room ventilation may be supplied from gymnasium exhaust which in turn can supply shower room ventilation.

e. Shops, laboratories, science and homemaking rooms shall each have separate ventilation systems. Local mechanical ventilation with hood vents shall be provided at benches for electric welding and also at spray paint stations in shops.

f. Internal combustion engines of vehicles and emergency generators shall be exhausted directly to the outdoors. Exhaust pipes shall not be terminated in shafts. Carbon monoxide exhaust systems are required in shops where three or more vehicles will be repaired, serviced or operated.

g. Boiler Rooms. (See 602-3a3n and 604).

h. Toilets. (See S707-6).

S606-5 Mechanical Cooling (Air-Conditioning)

a. During the normal school year there are many days when mechanical cooling provided by refrigeration equipment would be desirable, and to an even greater extent, when there is extensive summer use of rooms.

b. Heating, ventilating, refrigeration and air-conditioning installations shall meet requirements and recommendations of the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), as modified by these requirements.

S606-5

c. Refrigeration and air-conditioning piping and installations shall meet the requirements and recommendations of the ANSI Refrigeration Safety Code B9.1. Relief valves for refrigeration equipment located in the school building must be vented to the outside. Outdoor condensing units must also be provided with relief valves.

d. Condensing units for refrigeration and air-conditioning equipment shall be located where adequate ventilation will be available for the satisfactory operation of such equipment. Such units shall not be located in storage areas which have minimal or no ventilation.

e. Heat gain may be based on summer conditions in the 2½% column of Guide Tables on Weather Data and Design Conditions, ASHRAE Handbook of Fundamentals, designed to produce a maximum of 78°F. dry bulb room temperatures. See S606-1a.

f. Mechanical cooling shall be based on 5 cfm minimum outside air per occupant. For efficient use of energy, reheat systems, whereby quantities of cold air must be heated to an acceptable discharge temperature after having been previously cooled by the use of refrigerant equipment, shall be avoided.

g. Mechanical Cooling of Interior Spaces

1. Interior spaces of pupil occupancy, which are approved because of educational program, shall be provided with equipment for mechanical cooling in accordance with the above criteria, except that during the heating season of the normal school year such mechanical cooling shall maintain a maximum temperature of 74°F. in such interior spaces when this temperature cannot be produced by natural cooling. See S606-3b.

PART VII

PLUMBING AND GAS FACILITIES

S701 DESIGN CRITERIA

a. General Provisions, Section S1 through S14 also apply to this Part.

S701-1 State Building Construction Code

a. Where specific requirements as deemed necessary by the Commissioner are not defined in this manual, these requirements shall be in substantial compliance with the provisions of the latest edition of the State Building Construction Code applicable to Plumbing.

S702 GENERAL

a. Complete, well-arranged, and well-maintained sanitary facilities are essential for comfort and convenience of the school child. The condition and sufficiency of these units affect the health and habits of the pupils.

b. Select equipment and design its operation so as to use energy efficiently.

c. Starting with the preliminary design stage, consideration shall be given to the needs of the physically handicapped persons who may be using the building. (See Appendix M.)

S703 SITE

a. See Part IV, Site and Utilities.

S704 WATER SUPPLY

a. See Section S404; Part IV, Site and Utilities.

S704-1 Water Softening

a. Generally, it is desirable to provide softened water at least for the domestic hot water line serving the kitchen, boiler, and other hot water outlets. Also, conditioned water should be provided for the cold water lines serving the kitchen and boiler room. Care shall be taken to insure that there is no recirculation and mixing of conditioned water and raw water in the distribution systems to prevent corrosion and restrictions in the pipe distribution lines. Check valves at strategic locations may have to be included.

S704-1 b. Water softening processes should be considered early in order to incorporate such equipment, where possible, into the final building plans and specifications. Inclusion of such equipment in the final plans is possible if the school is to be served by an available municipal or water district.

c. Wherever well water is to be the source of water supply, it is many times difficult to predict the water condition and to select the water softening process equipment. Water softening should then be considered for incorporation into the building project by means of a 'change order'. In such instances, piping arrangements and valves shall be incorporated in the plans and specifications to accommodate the addition of equipment at a later date.

d. Separate and special valved connections and piping arrangements shall also be provided for boiler water treatment as deemed necessary.

S704-2 Fire Hydrants

a. See Section 404c, Part IV, Site and Utilities.

S704-3 Swimming Pools

a. See S405a, Part IV, Site and Utilities.

b. Mechanical equipment plans and layouts for swimming pools, together with their specifications, shall be presented to the appropriate State Health Department Agency at least 60 days prior to the date of the approval desired from the Division of Educational Facilities Planning. Final plans and specifications for school buildings which include swimming pools shall not receive the approval of the Commissioner of Education until approval is granted by the State Department of Health.

S705 SEWAGE DISPOSAL

a. See S407, Part IV, Site and Utilities.

b. Grease traps and oil interceptors should be provided in kitchen and bus garage branches. If septic tanks are used, the acid-proof drain from the science laboratories should run into a separate "dry well." Art classrooms may also require clay traps and grease traps in the waste system, depending upon the extent of the instruction program.

c. Acid waste plastic drain piping, when used, shall conform to the requirements of Table 203-3.

S705-1 Roof Leaders

a. See Section S407d, Part IV, Site and Utilities.

b. Roof leaders must be conducted to the exterior of the building and off-site to existing municipal systems when available.

S706 PLUMBING

S706-1 Toilet Rooms (Also, See Appendix M - Physically Handicapped)

a. Toilet rooms for pupils of both sexes shall be located on each floor to provide greater convenience. It is not necessary to separate by great distances the toilet rooms for boys and girls, but their entrances should be screened. Deletion of doors and partitions separating boys water closets is approvable.

b. Toilet rooms for kindergarten and primary rooms should, if possible, be placed adjacent to these rooms, and open into them. For other elementary, junior high school, and senior high school pupils, the toilet rooms should be located in the elementary, junior high, or senior high school areas, respectively.

c. Toilets for public use should be conveniently available to the auditorium, gymnasium, and other parts of the school plant commonly used by the public. School toilets, if conveniently located, will sometimes serve this purpose. Toilets for public use as well as for team use should be provided convenient to the athletic field.

d. Special toilet rooms should be provided for school administrators, teachers, and service workers.

e. Hose bibbs and floor drains should be provided in every toilet room, with the floor pitching toward the drain.

f. Where school grounds are likely to be used on weekends, vacations, and other times when the school building, itself, is closed, it is advisable to provide toilet rooms for both sexes accessible to the outdoor physical education spaces without making it necessary to open up portions of the school building. This can often be done by planning the toilet facilities for the locker and shower rooms for exterior access, and then by providing a means for closing off these spaces from the locker and shower rooms.

S706-2 Size

a. Toilet rooms for general use should have a minimum width of 9 feet to allow for economical placing of fixtures. An additional access space of 30 inches back of the principal fixtures is desirable for pipes and service.

S706-3 Materials

a. Floors should be of ceramic tile or similar impervious masonry suffaces. Finished concrete floors in toilet rooms are not recommended.

b. Walls shall be of an impervious material, such as glazed tile, or vitreous cement enamel.

c. Stall partitions shall be of impervious material, such as baked enamel finish on metal, securely anchored. In girls' toilet rooms, compartments should be provided with doors having substantial, non-corroding hardware and rubber bumpers. In boys' toilet rooms, compartment doors are optional.

S706-4 Accessories

a. No toilet room is complete without soap dispensers, grab bars, toilet paper holders, waste containers, mirrors, shelves and hand drying facilities; and, sanitary napkin dispensers and waste receptacles are essential in toilet rooms for older girls. Mirrors should not be placed over lavatories.

S706-5 Water Closets, Urinals (Also See Appendix M - Physically Handicapped)

a. Water closets should be of vitreous china and the extended-lip or elongated type and should be equipped with impervious, open-front seats. The wall-hung type of water closet greatly facilitates the cleaning of toilet rooms. Individual flush valves are recommended where there is sufficient water pressure.

b. Urinals should be designed to retain a deep water seal in the bowl as in the pedestal and wall-hung types. They should be so installed as to minimize sharp angles and to facilitate cleaning. Individual flush valves for flushing are recommended.

c. The following ratio of fixtures to pupils shall be considered minimum, provided that no less than two fixtures be installed in each room. These ratios are for the elementary and secondary school levels. Primary grade pupils who are served by individual toilets need not be recalculated to determine these ratios.

Table 706-5c

	Water Closets	Urinals
Girls (elementary)	1:35	
Boys (elementary)	1:100	1:30
Girls (secondary)	1:45	
Boys (secondary)	1:100	1:30

S706-5 d. Additional facilities for special areas should be provided in excess of those determined by these ratios.

S706-6 Lavatories (Also, See Appendix M - Physically Handicapped)

a. Lavatories or wash basins shall be provided for toilet rooms in the ratio of one fixture to 75 pupils, and shall be placed so that the pupils will pass them as they leave the room. Heights should be a minimum of 25 inches from the floor for elementary grades and a minimum of 30 inches for high schools. Study should also be given to the use of group washing facilities near the entrance of the cafeteria.

b. Lavatories may be without a stopper. Both hot and cold water should be provided from single item mixing type faucets with spray nozzles. Positive temperature control should insure that the hot water will not exceed 100°F.

c. Lavatories may be located in an alcove immediately off the corridors and need not be located within the toilet rooms.

S706-7 Shower Heads

a. Shower heads with water saver nozzle and controls should be located at least 4 feet apart and not more than 6 feet above the floor for senior high schools. Junior high school shower heads should be between 54 and 56 inches from the floor. Vandal-proof heads are usually less trouble. Recommended valve height is 45 inches.

S706-8 Service Sinks

a. In the custodian's closet on each floor and in the custodian's service room, a service sink shall be provided. The sink should be placed low for convenience and have a chip-proof rim. Consideration should be given to the floor-recessed type of mop and service sink which has a rim approximately 8 inches above the floor. Faucets should be installed high enough above slop sinks to permit filling of water buckets. Service sinks should have available a three-quarter inch service pipe for flow of hot and cold water.

S706-9 Drinking Fountains (Also, See Appendix M - Physically Handicapped)

a. Provide water fountains at a ratio of one fountain to 150 pupils, with a minimum of one drinking fountain on each floor having pupil occupancy. Within this ratio of fountains, it is recommended that two fountains be located near the boys and girls adjacent toilet rooms.

b. Drinking fountains should be of an impervious material, of a type that will not permit the mouth of the pupil to come in contact with the nozzle, nor permit the water to fall back upon the nozzle. The fountain jets and all openings in the water supply piping should issue above the level of the fountain bowl rim.

S706-9 c. Recommended height to nozzles: kindergarten and primary, 24 inches; upper elementary and high school, 32 inches.

d. Fountains shall not be attached to lavatories or sinks and shall not be located in toilet rooms. They should be located convenient to primary rooms, gymnasiums, cafeterias, all-purpose rooms, playgrounds, and shops. It is not good practice to locate gymnasium drinking fountains and cuspidors within the gymnasium playing area. Water spilled on wood floors creates an unsightly, slippery, and hazardous condition and causes difficult maintenance problems. A better location is in adjacent alcoves or passage areas off the main floor. Where construction permits, fountains should be recessed full depth. In order to maintain clear corridor widths, maximum projections of fountains must be maintained as explained in S103.

e. Drinking fountains may be installed in conjunction with classroom sinks in the following manner: A shallow receptor for the fountain, having a minimum edge clearance from the sink of 6", may be installed in the counter top with its drain draining into the sink drain.

f. Drinking fountains of the frostproof type should be located convenient to the playground area.

S706-10 Floor Drains

a. In the shower and drying rooms sufficient floor drains should be provided and located so that no pupil needs to stand in or walk through waste water. Curbs with their attendant hazards can often be eliminated by judicious location of drains.

b. Automotive shops require floor drains in the center of an area approximately 14 x 14 feet in front of the overhead door. The floor in this area should slope to the drain, and an oil interceptor should be provided.

c. Cafeteria-kitchen floors should have drains where there is spillage or frequent hosing and cleaning is required. Floors under and around steamers and kettles should be drained independently of other floor areas.

S706-11 Outside Hose Fixtures

a. Hose fixtures should be provided around the perimeter of the building so as to provide accessibility of water for sprinkling and for maintenance. Frostproof hydrants here and elsewhere on the school grounds are highly desirable.

S706-12 Piping

a. Long-range economy usually justifies the use of noncorrosive pipe, selected not only for immediate demands but also with a view to possible expansion of the building and its services. Valves and fittings should also be selected with a view to ease of service and replacement. All valves should be tagged for identification and a chart of the piping layout should be readily accessible in the custodian's room. Draining and venting should be in accordance with commonly accepted standards of public work. Insulate all hot water piping.

S707 SPECIAL CONSIDERATIONS

S707-1 Cafeteria-Kitchen

a. In the cafeteria-kitchen provide pre-rinse hot water at 100°F, wash tank hot water at 140° to 160°F, and final rinse hot water (if no chemical sanitizer is used) at 180°F. Dynamic pressure should be a minimum of 20-25 psi.

S707-2 Art Classrooms

a. In art classrooms hot and cold water to sinks (with clay and grease traps) is usually necessary.

S707-3 Agricultural Shops

a. In vocational agriculture a milk testing sink is usually included. This same sink, which should be acid-proof with an acid-proof trap and waste, can also be used as a wash sink by the students.

S707-4 Domestic Hot Water

a. Domestic hot water heaters having a capacity of 400,000 BTU's per hour input or more must be provided with electronic flame safeguard controls in accordance with S602-3a; those having a capacity of less than 400,000BTU's per hour input must be provided with controls in accordance with S602-3b.

b. Consider use of separate instantaneous hot water heaters serving separate areas of the building rather than a central hot water source.

c. Provide water at 100°F. to all fixtures except in swimming pools.

S707-5 Illumination

a. See Table S303 and Table S803-1.

S707-6 Ventilation

a. Positive mechanical ventilation with separate duct system shall be provided from all toilet rooms; except that individual toilet rooms (one or two water closets, or one water closet and one urinal) located on exterior walls may have window ventilation.

S707-7 Fire and Smoke Control

a. Fire Extinguisher Equipment (See S-110-1).

S708 AIR POLLUTION

a. Heating plants of one million BTU rated input capacity or more (using coal or oil), and any kind of incinerator installation or other kind of installation capable of polluting the atmosphere must have the approval of the Department of Environmental Conservation before final approval by the Commissioner of Education can be given. (See Appendix E, Advancement of Plans Through the Division, for complete details) (See S406).

S709 GAS FACILITIES

a. See S409; Part IV, Site and Utilities.

b. Outside shut-off valves to shut off the supply of gas shall be installed and located for ready accessibility in case of emergency.

c. All gas equipment shall comply with AGA Listing or Approved Requirements and shall bear the listing or approval seal of a recognized testing agency such as the American Gas Association Laboratories, Inc. or Underwriter's Laboratories, Inc. Installation of gas equipment and piping shall be in accord with the applicable American National Standards Institute (ANSI) Code and the rules and regulations of the local gas utility.

d. All gas appliances shall be provided with suitable pressure regulation by approved individual regulator. It is not required that individual bunsen burner outlets be provided with pressure regulators.

e. Gas piping shall not be burned in slabs or under buildings unless there is no other reasonable location available. In such cases the gas pipe shall be encased in a gas tight casing which shall be vented to the atmosphere. Gas pipes shall not be run in or through heating ducts and shall not be installed in plenums where air is being returned to air handling systems for recirculation. Gas piping shall be in accordance with ANSI Z21.30 or Z83.1 (where applicable) and in accordance with the Public Service Commission Regulations NYCRR, Part 255 and the Federal Department of Transportation, Part 192.

S709 f. Gas Piping Tests

1. Gas piping with a working pressure up to 12" W.C. must be welded for pipe sizes 3" and over. The completed line is to be pressure tested with air or inert gas for a minimum of one hour at 15 psig.

2. Gas piping with a working pressure above 12" W.C. must be welded for pipe sizes 3" and over. The completed line is to be pressure tested with air or inert gas for a minimum of one hour at 1½ times the working pressure or a minimum of 50 psig.

3. Coated or wrapped pipe must be tested at 100 psig for a time period of 1 hour to insure the gas tightness of the pipe.

4. The source of test pressure shall be isolated before the pressure tests are made. Tests shall be made in the presence of the architect, engineer, or their representative in conjunction with the local gas utility requirements.

g. Utility gas admitted into school buildings shall also be adequately odorized to render it detectable as prescribed by the Public Service Commission. Liquefied petroleum gases shall be odorized as prescribed by NFPA Standard No. 58.

h. Whenever liquefied petroleum is used, special pipe joint compound resistant to liquefied petroleum gas shall be used.

i. Gas piping entering a building shall be sleeved and sealed as stated in S403d.

S710 BUILDING GAS PRESSURES

a. The allowable gas pressures within areas of the school building, other than the Boiler Room, (after the meter and/or regulators) will be the normal ½ psig or less service.

b. The allowable gas pressures within the Boiler Room, after the meter and/or regulators, may be up to 2 psig. Normally above ½ psig is only required for use in the Boiler Room. It will not be ordinary that gas pressure above 2 psig will be required and requests for utilization of gas pressures above 2 psig pressures will only be considered for approval upon formal presentation for such a request by the consulting engineer of technical reasons to the Division of Educational Facilities Planning.

S710

c. Pressure switches, pressure regulators, and other equipment requiring atmospheric pressure to balance a diaphragm shall be suitably vented to function properly. Over pressure relief valves, normally open vent solenoids, and other similar equipment shall be suitably vented to function properly and operate safely.

d. Gas pressure regulators designed and equipped with vent limiting devices need not be vented to the outdoors. Other gas pressure regulators shall be vented directly to the outdoors.

e. Relief valves and normally open vent valves shall be vented directly to the outdoors.

f. Vent line size

1. Vent lines for gas pressure regulators and other devices requiring venting which do not normally discharge gas through the vent shall be vented to the outdoors through a rigid pipe at least 3/4" in size. Consideration shall be given to increasing the size of the vent lines longer than 20 feet. Manifolding of these vents is allowed providing the cross-sectional area of a common vent line is equal to the sum of the cross-sectional areas of the manifolded vent lines.

2. Vent lines for relief valves and normally open vent valves shall be piped directly to the outdoors. (They shall not be vented commonly with devices requiring atmospheric air pressure to balance a diaphragm.) The size of these lines shall be calculated to provide full relief capacity under the conditions of design. The size of such lines shall never be less than the size of the connection at the device. Manifolding of these vent lines is allowed providing the cross-sectional area of a common vent line is not less than the cross-sectional area of the largest individual line plus 50% of the total cross-sectional area of all other connecting lines.

g. Vent termination - All vent lines shall terminate outdoors in a safe place and not less than 18" from any opening or overhang. Adequate means shall be employed to prevent water from entering the vent pipe, and also to prevent stoppage of it by insects or foreign matter.

S711 AREAS OF USE OF GAS DISTRIBUTION

a. Science classrooms - gas outlets at fixed spacing (usually 5 feet) at work counters.

b. Homemaking classrooms - outlets to gas burner type kitchen equipment.

c. Art classrooms - gas outlets at work counters (usually every 30 inches).

d. Gas fired kilns - whenever used, a control valve shall be provided.

e. Kitchens - as required by equipment.

f. Soldering and Annealing - with compressed air if a compressed air torch is to be used.

g. A master control valve shall be provided for the instructor's control in any space having 3 or more gas outlets. This valve may be either a manual or an electrically operated solenoid valve.

h. If gas outlets are in close proximity to water or air outlets, the gas supply pipe shall be equipped with a gas check valve.

PART VIII

ELECTRICAL WORK

S800 GENERAL

a. General Provisions, Section S1-S14 also apply to this Part.

b. All electrical work shall conform to the requirements of the latest National Electrical Code (NEC), NFPA Pamphlet No. 70.

c. All electrical devices, materials, and packaged equipment shall meet the requirements of a recognized testing agency such as the Underwriters Laboratories, and shall bear its label.

d. Transformer vault rooms, and equipment therein shall conform to the requirements of the National Electrical Code and provision shall be made for adequate ventilation. Outdoor transformers on concrete pads are permitted if totally encased. Installations shall conform to the National Electrical Code.

e. Electrical service lines must be placed underground from the utility company service or must not cross any usable portion of the site or play areas. Overhead electrical service may be extended along property lines or along driveways.

f. Elevators required by S102-1, dumbwaiters, and escalators, shall be designed, constructed, and installed according to ANSI Code A17.1, Parts I through IV and VIII through XIII.

g. The amount of energy consumed for electric power depends upon the magnitude and deviation of the loads, the efficiency of the motors and equipment, the line and transformer losses, and the power factor of the system. Select all equipment for maximum efficiency. Minimize demand loads through priority selectors, demand limiters, load shedding, and closely matching motor sizes to the actual brake horsepower demand.

h. Lighting is a major consumer of energy, both for the power required for lighting fixtures and, in interior spaces, for the energy required for air-conditioning to overcome heat from the lights. In the past, quantity of lighting was often equated with quality of lighting, leading to overlighted buildings and excessive energy consumption. Each room should be studied for its needs both in quality and quantity of lighting. Task lighting (or lighting designed for specific areas according to the tasks to be performed), although requiring a more extensive switching system, can cut down on the general foot candle levels in the area.

S801 TESTS

a. Tests of electrical work shall be made as equipment is installed and shall include a run under full load (or a reasonable overload) long enough to determine that no excessive heat will be developed at terminal points, switches, and other points of installation.

b. Complete tests shall be specified and shall be conducted of the fire alarm and exit light systems in the presence of engineer or architect.

S802 ELECTRIC HEATING

S802-1 Requirements

a. Electrical Space-Heating Equipment for school buildings must meet the general construction and performance requirements of Underwriters Laboratories, Inc. for Air-Heating Appliances, for Duct Heaters, and for Central Heating Furnaces, as well as the specific construction and performance requirements of this Manual. Attention is directed to the specific construction requirements for Guarding of Heating Elements and the performance requirements for Temperature and Abnormal Operation for Air-Heating Appliances. Attention is also directed to the specific construction requirements for Limit Controls and the performance requirements for Temperature and Test Enclosures, for Normal Tests and for Abnormal Tests for Duct Heaters. Also, attention is directed to the construction requirements for Enclosures and Limit Controls and the performance requirements for Temperature Tests for Central Heating Furnaces.

b. All electrical heating equipment shall be listed and marked by the Underwriters Electrical Appliance and Utilization Equipment List for installation in ordinary locations in accordance with the National Electrical Code. Electrical space heating equipment intended for use in hazardous locations, such as paint spray booths, must also meet the construction requirements of the Underwriters Laboratories, Inc., and must be listed by the Underwriters for such intended use.

c. Large open-coil resistance heating elements for use with fans or in air-handling units are required to be installed in heater rooms whose walls, floors, ceilings, and doors must have a fire resistivity of two hours or more. Duct work in heater rooms for such equipment shall be protected with 1½ hour fire rated dampers, or thermal rise detectors, or smoke detectors tied in with the fire alarm system. The electrical installation shall meet the requirements of the National Electrical Code. (Reference in this paragraph is made to large heating equipment which contains open-coil type heating element equipment and which is listed and marked by the Underwriters Laboratories or is designed by the consulting engineer.)

S802-1 d. Open-coil electric duct heaters may be installed in reheat applications for individual places of pupil occupancy and classrooms. Clearances must be maintained as approved by the standards of the Underwriters Laboratories, Inc.; the duct heaters for this application must be listed by the Underwriters Laboratories Inc. Such duct heaters shall not be accessible nor within reach of the occupants of the school building. A minimum horizontal distance of 24 inches shall be maintained from the outlet of the duct serving such classroom and, where practical, should have a ninety degree (90°) turn in the duct work from the outlet to the duct heater.

e. Fan-coil package heating and ventilating units of the open-coil heating element type may also be installed within the individual space where they serve areas such as All-Purpose Rooms, Gymnasiums, Auditoriums, or other places of assembly. However, such fan-coil package units must be approved as a package and must be listed by the Underwriters Laboratories Inc. as a fan-coil unit to insure safe and uniform air discharges across the heating coils. Underwriters Laboratories approval of individual components of the package does not constitute approval of the entire fan-coil open coil heating and ventilating unit. These units must not be accessible to the occupants of the place of assembly and must be installed at the ceilings of such spaces or in heater rooms. Clearances must also be maintained as approved by the Underwriters Laboratories.

f. Baseboard heaters, cabinet heaters, and unit ventilators must have heating elements of the enclosed, sheathed, and finned type and must be listed and approved by the Underwriters Laboratories.

g. Electrical heating systems must perform satisfactorily with respect to proper loading, convection, air flow, surface temperatures, clearances and within tolerable noise levels. Precaution shall be taken to avoid recessing heaters not intended for recessing and to maintain Underwriters Laboratories rated clearances between heating equipment and combustible materials and furnishings.

h. School building temperature controls incorporated with the above Electrical Space-Heating Equipment must operate such equipment safely and must limit air discharge to temperatures prescribed by the latest American Society of Heating, Refrigerating and Air-Conditioning Guide.

S803 ARTIFICIAL LIGHTING

S803-1 General

a. School buildings shall be provided with sufficient and suitable artificial light to conduct the school activities in the absence of natural light. The minimum acceptable standards are shown in Table S803-1.

S803-1 b. The use of plastics in light diffusing systems in ceilings is limited. See S205-10.

c. Specify energy efficient lighting equipment which will provide maximum lumen output with minimum wattage consumption.

d. Do not exceed lighting levels adapted to the expected function of a particular room or area. Provide minimum foot candle levels as required by Table S803-1 on the surfaces indicated (task lighting) with, generally, lower lighting levels throughout the rest of the room, but high enough to prevent undesirable contrasts.

e. Investigate the practicality of collecting heat energy generated by lighting equipment to supplement space heating in winter, and expelling it by natural cooling in summer, rather than imposing additional load upon refrigeration equipment.

S803-2 Switching

a. Contrary to popular thought, it is rarely economical in terms of energy to leave lights burning rather than switching them off and on. Wherever practicable, provide easily accessible local switching. Consider dual level illumination in all teaching spaces, one level suitable for reading and note taking, and a lower level for passive lectures. Provide low level lighting for custodial cleaning of the building. Low voltage switching may be practicable.

b. Effective switching may require automatic controls. Time-clock switches with manual overrides can turn off selected corridor and building lights at a certain hour, yet can be reactivated manually as needed. Timed devices may be applicable to storage and equipment areas and be set to automatically turn off after a specific time interval.

c. Switching of electrical lighting circuits shall be so arranged that interior places of pupil occupancy (without daylighting) shall either be circuited for some continuous lighting directly from the lighting panel, or shall be on key-operated switches mounted on the wall. Such interior spaces may include classrooms, large group instruction areas, libraries, study halls, music rooms, gymnasiums, and toilets. All natatoria (swimming pools) shall have some continuous lighting whether or not daylight is provided.

S803-3 Brightness Differences

a. See S302; Part III, Visual Environment.

b. See Table S302 for Recommended Limits of Brightness Ratios.

Table S803-1

Minimum Foot Candle Requirements

Location	Minimum Maintained Foot-Candles	Initial Foot-Candles
Classrooms, study halls, lecture rooms, libraries--on desks, tables, chalk and display boards	30	40
Office--on desks	30	40
Sewing rooms, music rooms, drafting rooms, art rooms and other rooms where fine detail work is to be done--on the work	40	53
Shops, laboratories--on the work	30	40
Gymnasiums, playrooms, swimming pools	20	27
Cafeterias and other similar places if used for study	20	27
Auditoriums	10	13
Corridors, stairs, passageways, and all indoor areas traversed by students	10	13
Locker rooms and toilets	10	13
Sightsaving classrooms-on desks, chalk and display boards	50	67

S804 EMERGENCY LIGHTING

a. An automatic emergency lighting system (not necessarily including a generating plant) is required for the exits and exitways from any place of assembly exceeding 1800 square feet, or with occupancy of 100 or more persons. These areas are as follows:

Auditoriums	Large Group Instruction Rooms
All Purpose Rooms	Other Combined Places of Assembly
Cafeterias	Playrooms
Gymnasiums	Swimming Pools

S805 EXIT LIGHTS

a. Red and white exit lights shall be provided in auditoriums, assembly halls, gymnasiums, stairways, corridors, and exits with illuminated signs showing the word "EXIT" in plainly legible letters not less than four and one-half inches high and with the strokes of each letter not less than three-fourths of an inch in width. Lights shall be located to readily identify an exit and indicate the path of travel to the exterior.

b. Exit signs circuiting shall be on a separate and segregated circuit wired to minimize the possibility of interruption.

S806 AUDITORIUM AISLE LIGHTING

a. To provide for proper safety when the auditorium is in darkness, it is recommended that aisle lights be installed on the side of the aisle seats at every third row on the main floor and every two rows in the balcony.

S807 FIRE ALARMS

S807-1 Requirements

a. Supervised (trouble bell-trouble light) fire alarm systems are required for all schools of two classrooms or more. These systems shall be designed to permit operation from convenient locations in corridors at the main exit doors (at same point with the fire extinguishers) and also from areas having unusual fire hazards, such as shops (if over 1,000 square feet, one station for each 2,000 square feet or fraction thereof), cafeteria-kitchens, and boiler or heater rooms, with a practice switch or operation control located convenient to the office for use in fire drills. In these areas fire alarm stations shall be located near exit doors. No point in the corridor shall be more than 120 feet from a fire alarm station. Either manual/electric or automatic/electric systems are acceptable, depending

S807-1 upon the size of the building if the signals are designed to give positive warning to all points of the building, regardless of other noises and activities. The trouble signal of the supervised system shall be located in the main office. Warning signals shall ring continuously until it has been determined that fire safe conditions prevail in the school building.

b. School fire alarm or detection systems, smoke detection systems or sprinkler systems, as provided, must be interconnected with the fire department reporting location or system affording service to the building. Upon the sounding of a school alarm, such signal shall automatically be transmitted to the fire department reporting location or system.

c. Any school located in a municipal fire district having a general fire alarm system shall be provided with a fire alarm box on the premises which shall be interlocked with the school system to automatically notify the fire department reporting system. The typical alarm box used in the city, village, town, or fire district is to be located on the premises as directed by a responsible authority in the fire department.

d. The use of strident or panic-producing signals shall be avoided in auditoriums or other areas where panic might occur.

e. Fire alarm stations and gongs shall be on circuits separated and segregated from other circuits, wired to minimize the possibility of interruption and may be on the same panel with the exit light system.

f. The fire alarm system shall also be interconnected to disconnect motors operating ventilating fans and air handling systems and exhaust fans having a capacity greater than 1000 CFM. (Individual room unit ventilators are not required to be interconnected.)

g. Magnetic Door Holders: (See S807-3.c).

S807-2 <u>Thermal Detection Stations</u>

a. Thermal detectors are recommended for inclusion with fire alarm systems. It is recommended that fixed temperature detectors be provided for kitchens, boiler rooms, homemaking, shops, paint spray rooms and other areas which are hazardous and might experience a high rate of temperature rise in a short period of time. It is also recommended that rate-of-rise detectors be provided in storage rooms, janitor closets, main stages, attics, fan rooms, and other areas which have potential hazards would not experience a high rate of temperature rise in a short period of time. Generally, fixed temperature detectors are preferred, unless holding curcuits are provided in the enunciator to hold in the detector which has been energized and thereby prevent cycling.

S807-3 Smoke Detection Systems

a. A smoke detecting system may be required for those areas, or plenums, having unusual chimney effects for smoke and fire, such as stairwells and warm air heating and ventilation systems. Smoke detection systems, when provided, must be interconnected with the fire alarm system to automatically sound the internal fire alarm system as well as the municipal fire alarm system, or the fire department reporting system.

b. Open-planned buildings and buildings with interior pupil spaces may be required to have a smoke or fire detection system monitoring defined corridors, certain interior places of pupil occupancy, and places of assembly as deemed necessary, depending on the design of the building. Such systems then shall be integrated with the school fire alarm system and with the fire department reporting system.

c. Magnetic door holders normally holding doors in the open position must be interlocked with the fire alarm system so that, upon sounding of an alarm, the magnetic door holders will automatically allow the doors to close. It is recommended that smoke detectors be provided at the smoke enclosure and then these smoke detectors also must be interconnected with the fire alarm system. (See S109-4.c).

S808 AREAS OF SPECIAL ELECTRICAL NEEDS

a. Homemaking - 220 volt service to electric ranges, ovens, and clothes dryers.

b. Science - 110 volt outlets at frequent intervals over work counters and at work stations. (Incorporation of outlets in laboratory cabinets is a common practice.)

c. Commercial Areas - floor outlets for electrically operated office equipment.

d. Art - 110 volt outlets at 8 to 10 feet over work counters.

e. Electric Kilns - usually on a separate 220 volt circuit.

f. Shops - 220 volt, 3 phase power is more efficient for electric motors of ½ horsepower and up. Welding usually requires 220 volt, 1 phase power.

g. Kitchen - as required by equipment. 220 volt, 3 phase power is usually provided.

h. Stages - as required by the program.

i. Audio-Visual - 110 volts, 1 phase, 20 ampere circuits for machines of 1200-1500 watts.

S808 j. Finishing Rooms - areas such as finishing rooms used for brushing of paint and/or containing paint spray equipment shall have explosion-proof motors, non-arcing switches, and explosion-proof outlets and fixtures. Package paint spray booths may be used at secondary school levels where paint spraying is limited to small projects. For larger student projects, separate finishing rooms are required. Such explosion-proof equipment must be Underwriter's Laboratory approved and listed. Package paint spray booths equipment must also be U. L. approved and listed.

S809 INDUSTRIAL ART ROOMS

a. Lighting fixtures for industrial art rooms shall be of a type in which the maximum surface temperature of the lamp or tube does not rise above 165°C. Shielding of the lamps from accidental blows must also be provided.

b. Woodworking machine tools shall be provided with dust-tight plugs and receptacles, or shall be provided with a rigid to flexible permanent connection. Dust-tight motor starters are to be provided on such equipment.

c. Shaving or dust collecting devices shall be inherent within woodworking machine tools or otherwise some vacuum collecting device shall be attached for the gathering of shavings and dust particles.

d. Motors attached to woodworking machine tools shall be the self-enclosing type.

e. Shop emergency switches are required and shall be located one (1) on each wall of the industrial art room to de-energize the power panel in emergencies.

f. Where operations of a teaching space produce dust and fumes, precautions must be taken to avoid harmful and unsafe concentrations in the air. Such safeguards include dust collection devices inherent in the machine tools or dust collection systems for woodworking activities; and provisions for positive ventilation with hoods and duct systems for finishing rooms, welding areas, grinding operations, and automotive repair areas. Automotive areas where more than 3 vehicles are, or may be, stored shall have mechanical carbon monoxide exhaust systems.

S810 LOCKING DEVICES

a. Lighting and power panels shall be provided with locking devices and index cards showing circuits controlled by each breaker or switch.

S811 TELEPHONE

a. A public telephone shall be provided in all school buildings having pupil occupancy.

PART IX

EXISTING BUILDINGS

S901 General

a. Existing educational facilities in all school districts except in cities of one-hundred twenty-five thousand, or more, population, shall comply with Section 155.3 of the Regulations of the Commissioner of Education to insure the health, safety and accident protection of occupants.

b. The Regulations are printed in Appendix D.

c. School buildings are classified as Class "A", "B", or "C" construction as defined by the Local Finance Law. See Appendix A.2 and Appendix C.

APPENDIX A

GLOSSARY AND DEFINITIONS

addition - Extension or increase in area or height of a building.

alteration - Any change, rearrangement, or addition to a building, other than repairs; any modification in construction or in building equipment.

approved - Approved by the Commissioner of Education or by an authority designated by the Commissioner.

assembly space - An area used for the assembly of 100 or more persons, and spaces over 1800 square feet (exclusive of platform or stage) which are used for assembly occupancy of pupils. This includes auditoriums, stages, cafeterias, gymnasiums, natatoriums (those with spectator space), courts, little theatres, music rooms, and large group instruction rooms.

attic - Space between the top of the uppermost floor construction and the underside of the roof.

automatic - A process or action which does not depend upon manual operation but is accomplished by power furnished by a mechanical, electrical, or hydraulic source (or any combination of these).

basement - That space in a building which is partly below grade and has more than half its height (measured from floor to ceiling) above the average established curb level, or finished grade, of the ground adjoining the building.

building line - Line established by law, ordinance, or regulation, beyond which no part of a building (other than parts expressly permitted) shall extend.

cellar - That space in a building which is partly or entirely below grade and has more than half its height (measured from floor to ceiling) below the average established curb level, or finished grade, of the ground adjoining the building.

combustible - A material or combination of materials which will ignite and support combustion when heated to any temperature up to 1382°F (750°C) or which is capable of undergoing combustion in air, at pressures and temperatures that might occur during a fire in a building.

combustion - Any chemical process that produces light and heat either as glow or flame.

Commissioner - The Commissioner of Education.

construction classification - A classification of buildings into types of construction based on the fire resistance of walls, floors, roof, and other structural members.

Class A, B, and C construction are defined by the Local Finance Law, Article 2, Section 11, paragraphs 11-13. See pg. C.4. Following, for the purpose of this manual, are the relationships of these classifications to the classifications of the State Building Construction Code, (SBC), table C-202-2. It must be emphasized that the term "fire proof" is peculiar to the Local Finance Law and applicable to both Type 1 and 2 below.

Class A Construction

Type 1a and Type 1b. - SBC - fire resistive construction - that type of construction in which the walls, partitions, columns, floors, and roof are noncombustible with sufficient fire resistance to withstand the effects of a fire and prevent its spread from story to story.

Type 2a and Type 2b. - SBC - noncombustible construction - that type of construction in which the walls, partitions, columns, floors, and roof are noncombustible and have less fire resistance than required for fire-resistive construction.

Class B Construction

Type 3 - SBC - heavy timber construction - that type of construction in which the exterior walls are of masonry or other noncombustible materials having equivalent structural stability under fire conditions and a fire resistance rating of not less than two hours; in which interior structural members including columns, beams, and girders, are of heavy timber, in heavy solid or laminated masses, but with no sharp corners or projections or concealed or inaccessible spaces; in which floors and roofs are of heavy plank or laminated wood construction, or of any other material providing equivalent fire-resistance and structural properties. Noncombustible structural members may be used in lieu of heavy timber, provided the fire resistance of such members is not less than 3/4 hour.

Type 4 - SBC - ordinary construction - that type of construction in which the exterior walls are of masonry or of other noncombustible materials having an equivalent structural stability under fire conditions and a fire-resistance rating of not less than two hours, the interior structural members being wholly or partly of wood of smaller dimensions than those required for heavy timber construction.

Class C Construction

Type 5 - SBC - frame construction - that type of construction in which the walls, partitions, floors, and roof are wholly or partly of wood or other combustible material.

corridor - A passageway or hallway which provides a common way of travel to an exit or to another passageway leading to an exit. See definition of exit.

court, enclosed perimeter - An open, uncovered space surrounded on all sides by the exterior walls of a building or structure, or by such walls and an interior lot line of the same premises.

court, open - An open uncovered space which has at least one side opening onto an open space.

crawl space - An open, unfinished space between the foundation walls and immediately below the first floor less than a full story in height. Clear height between finish grade and the underside of the first floor construction can be any height from 1 foot up to 5 or 6 feet. The surface is usually bare earth.

curb level - The elevation of the curb opposite the center of the front of the building. If a building faces on more than one street, the curb level shall be the average of the elevations of the curbs at the center of each side or front of the building. Where no curb level or equivalent has been established by the municipal authority, the average elevation of the finished grade immediately adjacent to the front of the building shall be considered as the curb level. If a building faces on more than one street where no curb level has been established, the average of the elevations of the finished grade on each street side of the building shall be considered as the curb level.

exit - A way of departure from the interior of a building or structure to the exterior at street or grade, including doorways, passageways, hallways, corridors, stairways, ramps, fire escapes, and all other elements necessary for egress or escape. A single exit is one separate path of travel to the exterior of a building at grade.

Doors from small individual rooms, while constituting means of egress from the room, are not referred to as exits except where they open directly to the outside or other place of safety. Doors from large rooms constitute an integral part of the exit system and are referred to as exits from the room. Two doors which are remote from each other and which provide separate means of egress constitute two exits, but if the doors are adjacent and lead to a common path of travel to the exterior, they constitute one exit.

fire alarm system - An approved installation of equipment for sounding a fire alarm.

fire damper - An approved automatic or self-closing noncombustible barrier designed to prevent the passage of air, gases, smoke, or fire through an opening, duct, or plenum chamber.

fire detecting system - An approved installation of equipment which automatically actuates a fire alarm when the detecting element is exposed to fire or an abnormal rise in temperature.

fire limits - Boundary line establishing an area in which there exists, or is likely to exist, a fire hazard requiring special fire protection.

fire proof - As applicable only to useage in the Local Finance Law. See PS- C.4.

fire protection equipment - Apparatus, assemblies, or systems either portable or fixed, for use in preventing, detecting, controlling, or extinguishing fires.

fire resistance - (a noun) - The ability of properties of a material to resist the effects of fire and under fire conditions to prevent or retard the passage of excessive heat, products of combustion, or flame. Fire resistance also refers to the ability of properties of constructions, assemblies, and structures to resist the effects of fire - when expressed as a numerical value of time, it is referred to as the fire resistance rating.

See fire resistive.

fire resistive - (an adjective) - having the properties of fire resistance. Where materials, constructions, assemblies, and constructions are required to be fire resistive, they shall be of materials no part of which ignite and burn when subjected to fire.

See non-combustible.

fire retardant - To be classified "fire retardant" a tested material or surface treatment must reduce the flame spread of Douglas Fir at least 30% or to a flame spread classification of 70 or less, which ever is the lesser.

fire separation - A construction of specific fire resistance separating the parts of a building.

firestopping - A barrier effective against the spread of flames or hot gases within or between concealed spaces.

flame-resistant material - Material which is flame resistant by nature or has been made flame resistant in conformity with generally accepted standards.

flame spread - The propagation of flame over a surface.

flame spread rating - The measurement of flame spread on the surface of materials or their assemblies as determined by tests conducted in conformity with a generally accepted standard as ASTM E-84.

flammable - Capability of materials or combination of materials to ignite easily (within 5 seconds when exposed to flame), produce rapid flaming combustion, and rapid flame spread.

floor area - The floor area within surrounding walls of a building, or portion thereof.

flue - Enclosed passage, primarily vertical, suitable for removal to the outer air of the gaseous products of combustion.

generally accepted standard - A specification, code, rule, guide, or procedure in the field of construction, or in a field related thereto, recognized and accepted as authoritative.

grade, finished - Natural surface of the ground, or surface of ground after completion of any change in contour.

ground floor - The story of a school building immediately below the main floor and also below finished grade, but one in which the finished grade is not above the normal height of a classroom window sill.

height, building - Vertical distance measured from curb or grade level to the highest level of a flat or mansard roof, or to the average height of a pitched, gabled, hip, or gambrel roof, excluding bulkheads, penthouses, and similar constructions enclosing equipment or stairs, providing they are less than 12 feet in height and do not occupy more than 30 per cent of the area of the roof.

hoistway - A vertical opening, space, or shaftway in which an elevator or dumbwaiter is installed.

horizontal exit - A protected opening through or around a fire wall, connecting two adjacent floor areas, each of which furnishes an area of refuge, and from each of which required exits lead to legal open spaces.

interior finish - Material applied directly to walls, fixed or movable partitions, ceilings, and other exposed surfaces of buildings for acoustical correction, surface insulation, decorative treatment, or similar purposes, including but not limited to, veneer, wainscoting, paneling, and plastic wall covering.

interior trim - Material generally less than 12 inches in width, around openings in walls or ceilings, such as casings, stools, aprons, baseboards, chair rails, picture molds, cornice moldings, or moldings applied for decoration.

lobby - A lounge or waiting place adjacent to and connected with other spaces and also connected to a passageway serving as a principal entrance or exit.

lot line - A line dividing one premise from another, or from a street or other public space.

luminous ceiling - Light transmitting panels suspended below light sources and supported from the construction above.

masonry - A construction of units of such materials as clay, shale, concrete, glass, gypsum, or stone, set in mortar, including plain concrete, but excluding reinforced concrete.

mezzanine - An intermediate floor between the floor and ceiling of any story, covering less than the floor area immediately below. Space above and below a mezzanine shall have a minimum clear height of 7'-6".

municipality - A city, town, or village.

NYCRR - State of New York Official Compilation of Codes, Rules and Regulations. Prefix numbers indicate Title. Suffix numbers indicate Part (or Section).

non-combustible - (an adjective) - traditionally, the phrase "non-combustible material" has referred to materials which will not ignite and burn when subjected to fire, and there were comparatively few materials which would qualify. (i.e. metals, masonry, asbestos, plaster, etc.). Building materials are now available which, while not non-combustible in the traditional sense, are generally suitable for use in buildings.

Materials falling into group a, b, or c following are considered non-combustible, except that no material shall be classed as non-combustible which is subject to increase in combustibility or flame spread rating beyond the limits herein established, through the effects of age, moisture, or atmospheric condition.

(a). Materials no part of which will ignite and burn when subjected to fire. (For the purposes of this Manual, where materials falling into this group are required, fire resistive materials are called for. See definition of "fire resistive").

(b). Materials having a structural base of non-combustible material as defined in (a) with a surfacing not over 1/8" thick which has a flame spread not higher than 50.

(c). Materials, other than those described in (a) or (b), having a surface flame spread rating not higher than 25 without evidence of continued progressive combustion and of such composition that surfaces that would be exposed by cutting through the material in any way would not have a flame spread rating higher than 25 without evidence of continued progressive combustion.

opening protective - Assembly of materials and accessories, including frames and hardware, installed in a wall, partition, floor, ceiling, or roof opening to prevent, resist, or retard the passage of fire flame, excessive heat, or hot gases.
--automatic. Constructed and arranged to operate other than manually; if open, it will close when subjected to a predetermined temperature or rate of temperature rise.
--self-closing. Arranged and equipped with devices which will insure closing after having been opened.

or equal - See Appendix F.

owner - Board of Education, Trustees, Board of Cooperative Services.

property line - Line establishing the boundaries or premises.

pupil space, pupil occupancy - Space within a building for pupil use or any space which one or more pupils may at some time occupy as contrasted to space of no pupil occupancy such as teachers rooms, custodians rooms, boiler and incinerator rooms, fan rooms.

remote - At diagonally opposite corners or at opposite ends of a room or space.

repair - Replacement or renewal, excluding additions, of any part of a building, structure, device, or equipment with like or similar materials or parts, for the purpose of maintenance of such building, structure, device, or equipment.

shaft - A vertical or enclosed space extending through two or more floors of a building, or through a floor and roof.

shall - As used in this pamphlet, is mandatory.

smoke stop - A partition in corridors, or between spaces to retard the passage of smoke, with any opening in such partition protected by a door equipped with a self-closing device.

space of pupil occupancy - Any room or space housing pupils on a regular basis. The size of such a space and number of occupants is not readily defined; however, spaces such as classrooms, locker rooms, music practice rooms, seminars, and project areas, etc. would be included. Spaces with one to ten pupils who are under direct, responsible, adult supervision - such as a guidance office - would not generally be considered a space of pupil occupancy.

sprinkler system - A complete automatic sprinkler system which is installed in compliance with generally accepted standards.

stage - Space used for theatrical presentations, instruction, and demonstration purposes, usually at a level elevated from adjacent seating or audience space.

stairway - One or more flights of stairs and the necessary landings and platforms connected therewith to form a continuous passage from one floor to another.

story - Portion of a building which is between one floor level and the next higher floor level or the roof. If a mezzanine floor area exceeds one-third of the area of the floor immediately below, it shall be deemed to be a story. A basement shall be deemed to be a story when its ceiling is 6 or more feet above the finished grade. A cellar shall not be deemed to be a story. An attic shall not be deemed to be a story if unfinished and without human occupancy.

street - Thoroughfare dedicated and accepted by a municipality for public use or legally existing on any map of a subdivision filed in the manner provided by law.

structural damage - Loosening, twisting, warping, cracking, distortion, or breaking of any piece, or of any fastening or joint, in a structural assembly, with loss of sustaining capacity of the assembly. The following shall not be deemed to constitute structural damage: small cracks in reinforced concrete, perpendicular to the reinforcing bars; deformation of sheet material when a structural assembly is under applied load, which increases as such load increases but which disappears when such load is removed.

structural failure - Rupture; loss of sustaining capacity or stability; marked increase in strain without increase in load, deformation increasing more rapidly than the increase in imposed load.

structure - An assembly of materials, forming a construction framed of component structural parts for occupancy or use, including buildings.

temporary classrooms on school property - Leased or purchased, prefabricated and transportable units made and assembled by commercial interests.

temporary quarters - Substandard space in a building owned or leased by a school district for pupil occupancy, meeting the requirements of Part 155.4 of the Commissioner's Regulations, and used on a temporary basis subject to yearly approval by appropriate authority.

toilet, gang pupil - Enclosed space containing three or more water closets, which may also contain one or more lavatories and urinals.

toilet, individual pupil - Enclosed space for pupil use containing one to two water closets, which may also contain one or more lavatories and urinals.

toilet, public - Enclosed space containing one or more water closets which may also contain one or more lavatories and urinals.

toilet, teacher - Enclosed space containing one or more water closets, which may also contain one or more lavatories and urinals not for public use.

veneer - Thin pieces of material used as a finished surface over another material.

wall, curtain - A nonbearing wall between columns or piers that is not supported at each story.

wall, fire - A wall of noncombustible construction, with qualities of fire resistance and structural stability, which completely subdivides a building into fire areas, and which resists the spread of fire.

wall, panel - A nonbearing wall built between columns in skeleton construction and wholly supported at each story.

wall, spandrel - Portion of an exterior wall between top of one opening and bottom of another opening in the story directly above.

yard - An open unoccupied space on the same lot, plot, or parcel of land on which the building stands, which extends the entire length of the front or rear or interior lot line.

APPENDIX B

Generally Accepted Standards

A generally accepted standard is defined as a specification, code, rule, guide or procedure in, or related to, the field of construction which is recognized and generally accepted in the field as being authoritative.

The names and addresses of issuing or sponsoring organizations are listed for convenience. Specific standards having general application to public schools are also listed herein. The omission of a particular standard from this list does not constitute nonacceptance or disapproval.

Listed standards shall be construed to mean the latest, revised, current edition, modified by provisions of this manual. Reference: S5 and S6, page 2.

1. ISSUING ORGANIZATIONS

AA	The Aluminum Association 750 Third Avenue New York, New York 10017
ACI	American Concrete Institute P. O. Box 19150, Redford Station Detroit, Michigan 48219
AGA	American Gas Association Laboratories 8501 East Pleasant Valley Road Cleveland, Ohio 44131
AISC	American Institute of Steel Construction, Inc. 1221 Avenue of the Americas New York, New York 10020
AISI	American Iron and Steel Institute 1000 16th Street, NW Washington, D. C. 20036
AITC	American Institute of Timber Construction 333 West Hampden Avenue Englewood, Colorado 80110
ANSI	American National Standards Institute, Inc. 1430 Broadway New York, New York 10018
APA	American Plywood Association 1119 A Street Tacoma, Washington 98401

API	American Petroleum Institute 1801 K Street NW Washington, D. C. 20006
ASCE	American Society of Civil Engineers 345 East 47th Street New York, New York 10017
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. 345 East 47th Street New York, New York 10017
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, New York 10017
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, Pennsylvania 19103
AWS	American Welding Society 2501 NW Seventh Street Miami, Florida 33125
AWWA	American Water Works Association 2 Park Avenue New York, New York 10016
AWPA	American Wood Preservers' Association 1625 I Street, NW Washington, D. C. 20006
CISPI	Cast Iron Soil Pipe Institute 2029 K Street NW Washington, D. C. 20006
CPAI	Canvas Products Association International 600 Endicott Building St. Paul, Minnesota 55101
CS	Commercial Standards U.S. Department of Commerce National Bureau of Standards Office of Product Standards Washington, D. C. 20234
FCC	Federal Communications Commission
FMS	Factory Mutual System Factory Mutual Engineering Corporation 1151 Boston-Providence Turnpike Norwood, Massachusetts 02062

FS	Federal Supply Service Standardization Division General Services Administration
H	Handbooks, U.S. Department of Commerce National Bureau of Standards
MIL	Military Specifications Naval Supply Depot 5801 Tabor Avenue Philadelphia, Pennsylvania 19111
NBBPVI	National Board of Boiler and Pressure Vessel Inspectors 1155 North High Street Columbus, Ohio 43201
NFPA	National Fire Protection Association 470 Atlantic Avenue Boston, Massachusetts 02110
NFor.PA	National Forest Products Association 1619 Massachusetts Avenue NW Washington, D. C. 20036
NAPHCC	National Association of Plumbing, Heating, Cooling Contractors 1016 20th Street Washington, D. C. 20036
NSF	National Sanitation Foundation Ann Arbor, Michigan 48106
N.Y.C.R.R.	New York State Department of State 162 Washington Avenue Albany, New York 12225
PDI	Plumbing Drainage Institute 1018 N. Austin Boulevard Oak Park, Illinois 60302
RCRBS	Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation 345 East 47th Street New York, New York 10017
SPI	Society of Plastics' Industries, Inc. 250 Park Avenue New York, New York 10017
SBCC	State Building Construction Code Housing and Building Codes Bureau 2 World Trade Center New York, New York 10047

SJI	Steel Joist Institute Suite 707, 2001 Jefferson Davis Highway, Crystal City Plaza Arlington, Virginia
TPI	Truss Plate Institute 7100 Baltimore Avenue College Park, Maryland 20740
UL	Underwriters' Laboratories, Inc. 207 East Ohio Street Chicago, Illinois 60611 or 1285 Walt Whitman Road Melville, New York 11746

Federal Standards are obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402

2. SPECIFIC STANDARDS which are Generally Applicable to Public School Construction:

ANSI - American National Standards Institute

A2.1	- Fire Tests of Building Construction and Materials (ASTM E-119)
A2.5	- Surface Burning Characteristics of Building Materials (ASTM E-84, NFPA-255)
A9.1	- Safety to Life in Buildings, Code (NFPA-101)
A13.1	- Identification of Piping Systems
A17.1,1a	- Elevators, Dumbwaiters, Code
A54.1	- Carbon Dioxide Extinguishing Systems (NFPA-12)
A58.1	- Minimum Design Loads in Buildings
A117.1	- Physically Handicapped - Making Buildings Accessible To And Useable By
A131.4	- Smoke Detectors (UL-168)
C1	- National Electric Code (NFPA-70)
C5.1	- Lightning Protection Code (NFPA-78)
K65.21	- Flammability of Self-supporting Plastics (ASTM D-635)
K65.120	- Flammability of Flexible Plastics (ASTM D-568)
O1.1	- Wood Working Machinery, Safety Requirements
Z21.30	- Gas Appliances & Gas Piping Installations (NFPA-54)
Z95.1	- Oil Burning Equipment (NFPA-31)
Z97.1	- Safety Glazing Materials in Buildings
Z112.1	- Portable Fire Extinguishers (NFPA-10)
Z218.1	- Metal Safety Cans (UL-30)

ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning Engineers

Fundamentals Handbook
Guide and Data Book (Equipment, Systems, Applications)
#12 Refrigeration Terms and Definitions (ANSI-B53.1)
#15 Mechanical Refrigeration Safety Code (ANSI B9.1)

ASTM - American Society for Testing Materials

D568	- Tests for Flammability of Flexible Plastics ANSI-K65.120
D635	- Flammability of Self-supporting Plastics ANSI K65.21
D648	- Deflection Temperature of Plastics Under Load ANSI-K65-222
D1929	- Ignition Properties of Plastics ANSI-K65-111
D2843	- Measuring the Density of Smoke of Plastics
E84	- Surface Burning Characteristics of Building Materials ANSI A2.1, NFPA-255
E108	- Fire Tests on Roof Coverings
E119	- Fire Tests of Building Construction and Materials ANSI-A2.1

N.F.P.A. - National Fire Protection Association

10	- Portable Fire Extinguishers (ANSI Z112.1)
12	- Carbon Dioxide Systems (ANSI A54.1)
12A,12B	- Halon Systems
13	- Sprinkler Systems
30	- Flammable and Combustible Liquids Code
31	- Oil Burning Equipment (ANSI Z95.1)
40	- Cellulose Nitrate Motion Picture Film
54	- Fuel Gas Code (ANSI Z21.30)
70	- National Electric Code (ANSI C1)
72A	- Local Protective Signaling Systems
B	- Auxillary Signaling Systems
E	- Automatic Fire Detectors
78	- Lightning Protection Code (ANSI C5.1)
82	- Incinerators, Rubbish Handling
85	- Oil and Gas-Fired Watertube Boiler - Furnaces
85B	- Gas Fired Multi-Burner Boiler - Furnaces
85D	- Oil Fired Milti-Burner Boiler - Furnaces
90A	- Air Conditioning and Ventilating Systems
90B	- Warm Air Heating and Air Conditioning
101	- Life Safety Code (ANSI A9.1)
102	- Tents, Grandstands and Air Supported Structures
220	- Building Construction, Standard Types
255	- Building Materials, Tests of Surface Burning (ANSI A2.5) (ASTM E-84)
703	- Fire Retardant Treatments, Building Materials

NSF - National Sanitation Foundation

No. 1 - Soda Fountain and Luncheonette Equipment
No. 2 - Food Service Equipment
No. 3 - Spray-Type Dishwashing Machines
No. 4 - Commercial Cooking and Warming Equipment
No. 6 - Dispensing Freezers
No. 7 - Food Service Refrigerators and Storage Freezers
No. 8 - Commercial Powered Food Preparation Equipment
No. 9 - Diatomite-Type Filters for Swimming Pools
No. 10 - Sand-Type Filters for Swimming Pools
No. 11 - Recessed Automatic Surface Skimmers for Swimming Pools
No. 13 - Refuse Compactors and Compactor Systems
No. 14 - Thermoplastic Materials, Pipe, Fittings, Valves, Traps and Joining Materials
No. 15 - Thermoset Plastic Pipe, Fittings, Valves, Tanks, Appurtenances, Joining Materials and Thermoset Plastic Coatings for Use in Potable Water Supply Systems
No. 18 - Manual Food and Beverage Dispensing Equipment
No. 19 - Adjustable Output Rate Chemical Feeding Equipment for Swimming Pools
No. 20 - Commercial Bulk Milk Dispensing Equipment and Appurtenances
No. 22 - Swimming Pool Water Treatment Chemicans and/or Processes
No. 25 - Vending Machines for Food and Beverages
No. 33 - Commercial Cooking Equipment Exhaust Systems
No. 42 - Filtration Devices Relating to Supplementary Treatment of Potable Water
No. 43 - Chemical Feeding and Processing Equipment Relating to Supplementary Treatment of Potable Water

C-2 - Special Equipment and Devices, Food Equipment

NYCRR - New York State Standard Compilation of Codes, Rules and Regulations

6NYCRR	200	-	Air Resources
6NYCRR	320	-	Pesticide Control
6NYCRR	600	-	Water Regulation
8NYCRR	155	-	Educational Facilities
9NYCRR	800	-	General Building Construction Code (Code C)
9NYCRR	900	-	Plumbing Code (Code P)
10NYCRR	5	-	Water Supplies
10NYCRR	6	-	Swimming Pools
12NYCRR	4	-	Boilers
12NYCRR	12	-	Control of Air Contaminant
12NYCRR	14	-	Steam Boilers
12NYCRR	18	-	Exhaust Systems
12NYCRR	19	-	Guarding of Dangerous Machinery
12NYCRR	21	-	Window Cleaning
12NYCRR	47	-	Transparent Glass Doors
16NYCRR	255	-	Gas Transmission

U.L. - Underwriters Laboratories, Inc.

Air Conditioners, Central Cooling.....No. 465
Air Conditioners, Room.....No. 484
Air Ducts.....No. 181
Boiler Assemblies, Oil-Fired.....No. 726
Building Construction and Materials, Tests for Fire Resistance of.....No. 263
Building Materials, Tests for Surface Burning Characteristics of.....No. 723
Circuit Breakers, Molded Case, and Circuit Breaker Enclosures.....No. 489
Containers, Metal Safety.....No. 30
Control Units for Fire-Protective Signaling Systems.....No. 864
Controls, Limit.....No. 353
Dampers, Fire.....No. 555
Dishwashers, Commercial Electric.....No. 921
Emergency, Lighting Equipment.....No. 924
Extinguishers, Carbon Dioxide Fire.....No. 154
Extinguishers, Dry-Chemical Fire.....No. 299
Extinguishers, Fire, Rating and Fire Testing of....No. 711
Extinguishers, Water Type Fire, 2½-Gallon Stored Pressure.....No. 626
Extinguishing Equipment, Air-Foam and Liquid Concentrate Fire.....No. 162
Fire Alarm Devices, Single and Multiple Station, Mechanically Operated Type.....No. 539
Fixtures, Electric Lighting.....No. 57
Furnaces, Central, Oil-Fired.....No. 727
Fusible Links for Fire Protection Service.....No. 33
Ground Fault Circuit Interrupters.....No. 943
Hardware, Panic.....No. 305
Heat Pumps.....No. 559
Heaters, Air, and Direct-Fired Heaters, Oil Fired..No. 733
Heating Appliances, Electric.....No. 499
Heating Elements, Sheathed.....No.1030
Heating Equipment, Electric Baseboard.....No.1042
Heating Equipment, Electric Central Air.....No.1096
Heating Equipment, Gas-Fired, Commercial-Industrial.....No. 795
Hydrants for Fire Protection Service.....No. 246
Intrusion-Detection Units.....No. 639
Lighting Fixtures and Junction Boxes, Underwater, Electric, for Swimming Pools.....No. 676
Motors, Electric.....No.1004
Oil Burners.....No. 296
Outlet Boxes and Fittings, Electrical.....No. 514
Panelboards, Electric.....No. 67
Power Outlets, Electrical.....No. 231
Power Roof Ventilators, Electric.....No. 705

Protectors for Electric Motors, Thermal.....No. 547
Refrigeration and Air-Conditioning Condensing and Compressor Units.....No. 303
Refrigerators, Commercial.....No. 471
Roof Assemblies, Tests for Wind-Uplift Resistance of.....No. 580
Roof Covering Materials, Tests for Fire Resistance of.....No. 790
Roof Coverings, Built-Up, Materials for.....No. 55A
Service Equipment, Electrical.....No. 869
Signaling System Boxes, Manually Actuated, for Fire Alarm Service.....No. 38
Smoke Detectors, Photoelectric Type, for Fire Alarm Service.....No. 168
Space Heating Equipment, Electric.....No. 573
Swimming Pool Pumps, Filters, and Chlorinators, Electric.....No.1081
Switchboards, Electrical, Dead-Front.....No. 891
Thermostats, Fire-Detection.....No. 521
Water Coolers, Drinking, Refrigerated.....No. 399
Water Heaters, Electric-Storage Tank.....No. 174
Water Heaters, Oil-Fired Storage Tank.....No. 732

APPENDIX C

LAWS (EXCERPTS) RELATING TO SCHOOL BUILDING PROJECTS

Education Law

Section 408, subdivision 1, 2, 3 and 4
Section 409
Section 7209, subdivisions 1 and 3

General Municipal Law

Section 101, subdivision 1 and 2
Section 102, subdivision 1 and 2
Section 103, subdivision 1 and 2
Section 105, subdivision 1

Local Finance Law

Section 11, subdivision 11 and 12
Section 165

EDUCATION LAW - **Excerpts**

Section 408. Plans and specifications of school buildings must be approved by the commissioner of education

1. No schoolhouse shall hereafter be erected, repaired, enlarged or remodeled in any school district except in a city school district in a city having seventy thousand inhabitants or more, at an expense which shall exceed one hundred thousand dollars, until the plans and specifications thereof shall have been submitted to the commissioner of education and his approval endorsed thereon. Such plans and specifications shall show in detail the ventilation, heating and lighting of such buildings.

In the case of a school district in a city having seventy thousand inhabitants or more, all of the provisions previously set forth in this subdivision shall apply...

In either case, the commissioner may, in his discretion, review plans and specification for projects estimated at an expense of less than one hundred thousand dollars.

2. The commissioner of education shall not approve the plans for the erection of any school building or addition thereto or remodeling thereof unless the same shall provide for heating, ventilation, lighting, sanitation, storm drainage and health, fire and accident protection adequate to maintain healthful, safe and comfortable conditions therein and unless the county superintendent of highways or commissioner of public works has been advised of the location of all temporary and permanent entrances and exits shown on public highways and the storm drainage plan which is to be used.

3. The commissioner of education shall approve the plans and specifications, heretofore or hereafter submitted pursuant to this section, for the erection of any school building or addition thereto or remodeling thereof on the site or sites selected therefor pursuant to this chapter, if such plans conform to the requirements and provisions of this chapter and regulations of the commissioner adopted pursuant to this chapter in all other respects; provided, however, that the commissioner of education shall not approve the plans for the erection of any school building or addition thereto unless the site has been selected with reasonable consideration of the following factors; its place in a comprehensive, long-term school building program; area required for outdoor educational activities; educational adaptability, environment, accessibility; soil conditions; initial and ultimate cost.

4. No funds voted by a district meeting or other competent authority in any school district to which the provisions of subdivision one of this section are applicable, exceeding the amounts specified in such subdivision, shall be expended by the trustees or board of education until the commissioner of education shall certify that the plans and specifications for the same comply with the provisions of this section.

Section 409. School building regulations in relation to health and safety

All school buildings of school districts other than city school districts of cities having one hundred twenty-five thousand inhabitants or more shall comply with such regulations as the commissioner of education shall adopt from time to time for the purpose of insuring the health and safety of pupils in relation to proper heating, lighting, ventilation, sanitation and health, fire and accident protection.

Section 7209. Special provisions

1. ...all plans, specifications, ...relating to the construction or alteration of buildings or structures ... shall be stamped with such seal and shall be signed, on the original with the personal signature of such professional engineer....No official of this state, or of any city, county, town or village therein, charged with the enforcement of laws, ordinances or regulations shall accept or approve any plans or specifications that are not stamped:...With the seal of an architect or professional engineer....

3. No county, city, town or village or other political subdivision of this state shall engage in the construction or maintenance of any public work...for which plans, specifications and estimates have not been made by, and the construction or maintenance supervised by, a professional engineer ...; provided that this section shall not apply to the construction...of county roads or town highways, nor to any other public works wherein the contemplated expenditure for the completed project does not exceed five thousand dollars. This section shall not be construed as effecting or preventing...engaging an architect licensed in this state for the preparation of plans, specifications and estimates for and the supervision of construction or maintenance of public works.

GENERAL MUNICIPAL LAW - **Excerpts**

Section 101. Separate specifications for certain public work

1. Every officer, board or agency of a political subdivision . . . charged with the duty of preparing specifications or awarding or entering into contracts for the erection, construction, reconstruction or alteration of buildings, when the entire cost of such work shall exceed fifty thousand dollars, shall prepare separate specifications for the following three subdivisions of the work to be performed:

(a) plumbing and gas fittings;

(b) steam heating, hot water heating, ventilating and air conditioning apparatus; and

(c) electrical wiring and standard illuminating fixtures.

2. Such specifications shall be drawn so as to permit separate and independent bidding upon each of the above three subdivisions of work. All contracts awarded ...shall award the three separate subdivisions of the above specified work separately.... Nothing in this section shall be construed to prevent any political subdivision from performing any such branches of work by or through their regular employees....

Section 102. Deposits on plans and specifications

1. ...The officer, board or agency in any political subdivision or of any district therein, charged with the duty of preparing plans and specifications for and awarding or entering into contracts for the performance of public work shall require, as a deposit to guarantee the safe return of plans and specifications, the payment of a fixed sum of money not exceeding one hundred dollars for each copy thereof.... Any person or corporation desiring a copy of such plans and specifications and making the deposit required by this section shall be furnished with one copy of the plans and specifications.

2. If a proposal is duly submitted by any person or corporation making the deposit...and if the copy of the plans and specifications used by such person or corporation, other than the successful bidder, is returned in good condition within thirty days following the award of the contract covered by such plans and specifications or the rejection of the bid of such person or corporation, the full amount of such deposit for one copy of the plans and specifications shall be returned to such person or corporation, including the successful bidder. Partial reimbursement may be made for the return of all other copies of the plans and specifications in good condition within thirty days following the award of the contract or the rejection of the bids covered by such plans and specifications.

Section 103. Advertising for bids; letting of contracts; criminal conspiracies

1. ...All contracts for public work involving an expenditure of more than thirty five hundred dollars or on purchase contracts involving an expenditure of more than fifteen hundred dollars shall be awarded by the appropriate officer, board or agency of a political subdivision or of any district therein...to the lowest responsible bidder furnishing the required security after advertisement for sealed bids in the manner provided by this section....

2. Advertisement for bids shall be published in the official newspaper or newspapers, if any, or otherwise in a newspaper or newspapers designated for such purpose. Such advertisement shall contain a statement of the time when and place where all bids received pursuant to such notice shall be publicly opened and read.... All bids received shall be publicly opened and read at the time and place so specified. At least five days shall elapse between the first publication of such advertisement and the date so specified for the opening and reading of bids.

Section 105. Disposition of deposit accompanying bid

1. ...Wherever as a condition precedent to the reception of consideration of a bid for furnishing supplies, materials or equipment or performing work for a political subdivision...or of any district therein, a deposit of a certified check, money, bonds or other obligation is required, a person or corporation submitting a bid may withdraw the same if no award of the contract be made within forty-five days after the receipt thereof, and upon such withdrawal such deposit shall be forthwith returned....

LOCAL FINANCE LAW - **Excerpts**

Section 11.00 Periods of Probable Usefulness

a. A municipality, school district or district corporation may not contract indebtedness for any object or purpose for a period longer than the period of probable usefulness set forth below... Preliminary costs of surveys, maps, plans, estimates and hearings in connection with a capital improvement, and cost incidental to such improvement, ... shall be deemed part of cost of the object or purpose....

11. Buildings. The acquisition or construction of buildings...whether or not including grading or improvement of the site, original furnishings, equipment, machinery or apparatus required for the purposes for which such buildings are to be used, as follows:

(a) Class "A" (fireproof and certain fire resistant) buildings.

(1) Buildings, the walls of which are constructed of brick, stone, concrete, metal or other incombustible material, and in which there are no wooden beams or lintels, except wood glue laminated structural members, and in which the floors, roofs, stairhalls, and other means of vertical communication between floors and their enclosures are built entirely of brick, stone, metal or other incombustible materials, and in which no woodwork or other inflammable material is used in any of the rough partitions, floor or ceiling structures, or

(2) Buildings, not more than one story above the ground, the outer walls of which are constructed of brick, stone, concrete, metal, stucco or other fire resisting material and which are to be used as schoolhouses by school districts wholly outside of a city, thirty years.

(b) Class "B" (fire-resistant) buildings.

Buildings, the outer walls of which are constructed of brick, stone, concrete, metal, stucco or other fire resisting materials, twenty years.

(c) Class "C" buildings. Buildings which are neither Class "A" or Class "B", as defined in items (a) and (b) above, including any such building which is rebuilt or altered so that it, together with any addition or vertical or other extension is not fire-proof or fire resisting, as thus defined, fifteen years.

12. Additions to or conversion of buildings.

(a)(1) The construction of an addition or additions to or the reconstruction of a Class "A" building, twenty years, except as hereinafter provided: the conversion of a Class "B" or Class "C" building, into a Class "A" building, twenty years....

(2) The construction of an addition or additions to or the reconstruction of a Class "B" building or the conversion of a Class "C" building into a Class "B" building, fifteen years.

(3) The construction of an addition or additions to or the reconstruction of a Class "C" building, ten years.

(b) The periods of probable usefulness set forth in item (a) above shall include original furnishings, equipment, machinery or apparatus required for the purposes for which such additions to such building or for which such reconstructed or converted buildings are to be used.

(c) A building which is to be attached to an existing building or buildings shall be deemed to be a new building and not an addition if the probable useful life thereof is not dependent upon the useful life of such existing building or buildings.

(d) The terms "Class 'A' building", "Class 'B' building", and "Class 'C' building" as used in this subdivision, shall mean such buildings as they are described in subdivision eleven of this paragraph.

13. Certain building alterations. The installation or reconstruction of a heating plant, lighting, plumbing, ventilating, elevator or power plant or system in a building when not in connection with the original construction or the reconstruction of such building, in a Class "A" or "B" building, ten years; in a Class "C" building, five years....

Section 165.00 Deposit and use of proceeds from sale of bonds, bond anticipation notes, capital notes, urban renewal notes or budget notes

a. The proceeds, inclusive of premiums, from the sale of bonds, bond anticipation notes, capital notes, urban renewal notes or budget notes shall be deposited in a special account in a bank or trust company located and authorized to do business in this state, shall not be commingled with other funds of the issuer, and shall be expended only for the object or purpose for which such obligations were issued. In the event that any portion of the proceeds...is not expended for the object or purpose for which such obligations were issued, such portion shall be applied only to the payment of the principal of, and interest on such obligations, respectively....

APPENDIX D

REGENTS RULES AND REGULATIONS OF THE COMMISSIONER RELATING TO EDUCATIONAL FACILITIES

REGENTS RULES, (8NYCRR14) Section 14.1 - School Buildings and Grounds

a. Regulations. The Commissioner shall make regulations governing the requirements for the plans and specifications for the erection, repair, enlargement and remodeling of school buildings.

b. General requirement. Each school district shall provide suitable and adequate school buildings and grounds for the instruction and accommodation of the pupils of such district.

REGULATIONS OF THE COMMISSIONER OF EDUCATION
Part 155
(8NYCRR155)
EDUCATIONAL FACILITIES

Section 155.1 Educational facilities. Each school district shall provide suitable and adequate facilities to accommodate the programs of such district. (a) Each school district shall develop and keep on file, a comprehensive long-range plan pertaining to educational facilities. Such plan shall be re-evaluated and made current at least annually, and shall include appraisal of the following: the educational philosophy of the district, with resulting administrative organization and program requirements; present and projected pupil enrollments; space use and state rated pupil capacity of existing facilities; priority of need of maintenance, repair or modernization of existing facilities, including consideration of the obsolescence and retirement of certain facilities; and the provision of additional facilities.

(1) The number, types, space requirements and pupil capacities of facilities shall be in relation to the present and projected needs of the school district programs, including mandated educational requirements.

(2) Pupil enrollment projections shall be based on a school district census projection of each grade level. Elementary grade enrollments, kindergarten through sixth grade, shall be projected a maximum of five years. Secondary grade enrollments, seventh through twelfth grade, shall be projected a maximum of ten years.

(3) Educational specifications for the erection, enlargement or remodeling of educational facilities shall be submitted to the Commissioner. Such specifications shall be based on the comprehensive long-range plan of the district and shall include the educational philosophy of the project, description of educational program, including activities to be conducted and related space and facilities requirements; and description of innovative or experimental concepts or features which may be included.

(b) Facilities shall be designed and constructed to provide for the health and safety of occupants with consideration of educational and planning efficiency, conservation of natural resources, practicality, and initial and long-range economy, and shall support an environment within the facility which is conducive to learning.

(1) Design of a facility shall provide space layouts and number, size and arrangement of exit facilities that will insure prompt escape of occupants from a hazard to life safety.

(2) Visual environment of a facility. (i) Adequate levels of illumination, consistent with efficient energy consumption, shall be provided in each area of a facility for the tasks being performed.

(ii) Natural and artificial lighting shall produce a controlled environment of balanced brightness, free from objectionable glare.

(iii) Teaching areas shall have fenestration which permits a view of the exterior, unless otherwise approved by the Commissioner.

(iv) Teaching spaces shall be properly proportioned as to size and shape of room, including ceiling height.

(v) Color, finishes, lighting, furnishings and related items shall reasonably be combined to provide an aesthetic learning environment.

(3) Thermal environment of a facility. (i) Controlled heating and ventilation shall be provided and maintained in all areas to produce conditions suitable for the varying activities that take place in the various areas by systems providing efficient consumption of energy.

(ii) Each teaching space shall be provided with a controlled supply of fresh air and shall have sufficient air changes to produce healthful conditions and avoid odors or build-up or concentrations of toxic substances or dust particles.

(iii) When teaching spaces cannot be provided with an adequate thermal environment by ventilation as determined by the Commissioner, provision for cooling may be required by the Commissioner.

(4) Sanitation. (i) Water shall be safe and potable from an approved source and shall be dispensed within a facility from sanitary drinking fountains.

(ii) Toilet rooms shall have an adequate number of proper fixtures.

(iii) Sanitary sewers shall be connected to a municipal sewage system or an approved on-site disposal system.

(c) Sites for the erection or enlargement of facilities shall be approved by the Commissioner, provided they have been selected with reasonable consideration of the following factors:

(1) Size and location of a site shall be consistent with the long-term building plans of the district;

(2) Sites shall be educationally adaptable with consideration for situation of building and development of the grounds for outdoor educational program and related activities, without excessive initial or development costs and shall provide the following minimum usable acres, unless otherwise approved by the Commissioner:

(i) Elementary schools (kindergarten through sixth grade): Three acres base plus one acre for each one hundred pupils, or fraction thereof;

(ii) Secondary schools (seventh through twelfth grade): Ten acres base plus one acre for each one hundred pupils, or fraction thereof;

(3) Sites shall be developed to conserve natural resources and avoid environmental problems within the limits of the educational program. Care shall be taken to insure that the site and facilities thereon are consistent with and contribute to the school and community environment and provide for the health and safety of occupants.

Section 155.2 Plans and specifications. (a) Plans and specifications for the erection, enlargement, repair or remodeling of facilities of school districts, other than in city school districts in cities having one million inhabitants or more, shall be submitted to the Commissioner when the contemplated construction costs of such work is ten thousand dollars * or more, and for all projects affecting the health and safety of pupils.

(b) Plans and specifications, including addenda and change orders, shall be submitted to the Commissioner for approval in accordance with procedures set forth by the Commissioner. When approved, one set of plans and specifications shall be retained and one set, with approval of the Commissioner endorsed thereon, returned to school authorities for permanent filing.

(1) Plans and specifications shall show in detail requirements of design and construction, space layout, circulation and exiting facilities, smoke and fire control, accident protection, visual and thermal environment and related electrical and mechanical work, and sanitation and related plumbing work which insure the health, safety and comfort of occupants of the facility.

(2) Materials, equipment, and types of construction which may endanger the health, safety and comfort of occupants shall not be used.

(3) Construction materials, details and workmanship shall conform to generally accepted standards as determined by the Commissioner.

(4) Specifications for construction shall allow for equivalencies and shall not require the base bid to be based only on the materials or products specified.

(5) Specifications for construction shall require that contractors or suppliers furnishing mechanical equipment shall instruct the board of education or its representative in the proper operation and service of all such equipment at the time of completion and before acceptance of the building by the board of education.

* When construction costs are ten thousand dollars or more, building construction aid, pursuant to Education Law, Section 3602, is available for eligible capital outlays.

(c) Plans and specifications for portions of facilities which require approval by other departments of the State shall be approved by the appropriate agencies having jurisdiction as a condition of Commissioner's approval of plans and specifications of a facility.

(d) Decisions regarding compliance of plans and specifications with this section shall be determined by the Commissioner.

Section 155.3 Health and safety in existing educational facilities. Facilities in school districts other than city school districts in cities having one-hundred twenty-five thousand inhabitants or more, shall meet the following requirements, and in particular instances, such other requirements as may be deemed necessary by the Commissioner to insure the health and safety and accident protection of occupants. (a) Exits. (1) There shall be at least two means of egress remote from each other, leading from each floor occupied by pupils, including basements.

(i) When pupils enter into a corridor there shall be a choice of two unobstructed means of egress in different directions.

(ii) Handrails shall be provided on at least one side of stairways, and on both sides of stairways 88 inches or more in width.

(iii) There shall be no storage under any stairs or landings unless the enclosure is of approved fire resistant construction.

(iv) Provision of fire escapes of approved design may be required where other exits are determined to be inadequate for fire safety.

(2) Dead-end corridor pockets shall not exceed a maximum depth of one and one-half times the width of the pocket or one and one-half times the width of the corridor, whichever is less, unless otherwise approved by the Commissioner.

(3) Corridors and exitways shall be kept clear and free of obstructions at all times.

(4) Fixed and portable security gates shall not be located or used where they will obstruct exits or create dead-end conditions for occupied spaces.

(5) Every space of pupil occupancy over 500 square feet in area shall have two separate means of egress from such space. A space of pupil occupancy is any room or self-contained space housing pupils on a regular basis, other than a library, a place of assembly or small rooms where no more than ten pupils are under direct, responsible, adult supervision. Each means of egress shall be in a separate smoke zone, unless immediately adjacent to an approved exit. The primary exit is commonly the opening to the corridor. The second exit may be a door opening into a separate smoke zone; or a door directly to the exterior; or a window of such size and design that will facilitate egress; or a door providing egress through adjacent spaces where specifically approved.

(i) Any point in a space of pupil occupancy shall not exceed a maximum of 50 feet straight line distance to an exit, unless otherwise approved by the Commissioner. Any additional exit necessary to satisfy this requirement shall be remote and may be required to be directly to the exterior.

(ii) When spaces of pupil occupancy are defined in an open area by wardrobes, cabinetry and other furniture which does not present obstructions to egress and which allows students to circulate freely from one space to another, the total open space is considered, for exiting purposes, as a single space. Exits from such open-planned space shall meet requirements determined by the Commissioner.

(6) Required emergency egress windows shall be of a size and design, including hardware, and in appropriate instances, steps or ladder to high sills, that will permit and facilitate emergency egress. Such windows shall be free of obstructing screens or storm sash.

(i) The minimum clear opening area for such windows shall be six square feet, with a minimum dimension of 24 inches, unless otherwise approved by the Commissioner.

(ii) At least one such window in each space of pupil occupancy shall be marked with an appropriate sign identifying it as an emergency egress window.

(7) Places of Assembly. A place of assembly is any area used for the assembly of 100 or more persons, and spaces over 1800 square feet in area used for the assembling of persons. (i) Maximum occupancy for places of assembly shall be based on the number and size of existing approved exits on the basis of 50 persons for each one-half exit unit of 11 inches. Where existing exits are inadequate for the occupancy capacity of a place of assembly, or when directed by the Commissioner, signs restricting the number of occupants shall be conspicuously posted at each exit location. Signs shall read in red letters on white background:

"MAXIMUM OCCUPANCY - 3" high, 3/4" stroke
NOT TO EXCEED - 2" high, 1/2" stroke
XXX PERSONS" - 3" high, 3/4" stroke

(8) Courtyards with completely enclosed perimeters are areas of possible pupil occupancy and must be provided with exits as a space of pupil occupancy and as follows, unless otherwise approved by the Commissioner:

(i) Enclosed courts up to 700 square foot area shall have at least one exit equipped with hardware of a type which will always permit the door to be opened from the court side without the use of a key;

(ii) Enclosed courts of more than 700 square foot area shall have at least two exits, remote from each other, equipped with hardware of a type which will always permit the door to be opened from the court side without the use of a key.

(9) Hardware. (i) All door hardware from spaces of pupil occupancy shall be of a type that will always permit the door to be opened from within the space without the use of a key.

(ii) All exterior and interior doors in exitways, and exit doors from places of assembly shall have panic hardware, except that panic hardware is not required for push/pull interior exit doors if these doors have non-latching hardware. Panic hardware shall not be required for exterior corridor doors serving less than 3 classrooms or for doors serving only service areas such as boiler room, kitchen or storerooms.

(iii) Exit doors shall not be locked or chained or otherwise rendered inoperable from the inside at any time.

(b) Smoke and Fire Control. As used in this subdivision, the terms Class "A", "B" or "C" refer to types of construction which are defined by subdivision 11 of section 11 of the Local Finance Law.

(1) In Class "B" and Class "C" buildings of two stories or more, unless otherwise approved, stairs shall be enclosed at each floor level and every floor shall be separated from levels above and below by stair enclosures and/or smoke barriers constructed to obstruct effectively the passage of smoke and fumes, or every space of pupil occupancy shall be provided with direct exit to the exterior. In appropriate instances, alternate means of egress may be required and stairway enclosures in Class "A" construction may be required.

(2) Class "B" and Class "C" buildings shall not have places of assembly above the first floor, except in a Class "B" building a written exception may be granted where it is determined by the Commissioner that adequate exits exist.

(3) In appropriate instances, doors, walls and ceilings of places of assembly and exitways (corridors, stairs, vestibules, etc.) may be required to be finished with fire retardant materials or coatings.

(4) Stairway enclosures required by paragraph 1 of this subdivision and smoke barriers required by paragraph 5 of subdivision(a)of this section shall be constructed of non-combustible materials of such design and detail to obstruct effectively the passage of smoke and fumes.

(i) Doors in stair enclosures and smoke barriers shall be metal, metal covered, approved treated wood construction, or solid bonded core wood doors not less than 1 3/4-inches thick.

(ii) Glazing in doors, sidelights and frames shall be 1/4-inch wire glass.

(iii) Such doors shall swing in the direction of egress, with no latching or locking devices unless operated by panic hardware. Double-acting hinged doors are not permitted and corridor pockets opposing swing of doors shall conform to the provisions of paragraph 2 of subdivision (a)of this section.

(iv) Such doors shall be self-closing and maintained in a normally closed position unless approved automatic release devices are provided, whereby upon interruption of an electrical circuit, the door is released and becomes self-closing. The electrical circuit shall be positively interrupted by operation of an approved smoke detection system and/or activation of the building fire-alarm system. Fusible links shall not be used to hold open such doors.

(5) Wood floors shall not be treated or finished with oil. Floors so finished previously shall be cleaned and re-finished with a penetrating seal.

(6) Fire extinguishers shall be located so that no point in a corridor, lobby, or stair is more than 120 feet from an extinguisher. Fire extinguishers shall also be placed readily accessible to auditorium stages, shops, cafeterias and kitchens, boiler rooms, science labs and accessible from other places which are possible sources of fire. Fire extinguishers shall bear the Underwriter's label and be of a type most suitable for the kind of fire most likely to occur in a given area.

(7) Fire resistive (hourly rated) floors, interior walls and doors, and ceilings shall be provided at the following spaces unless otherwise approved by the Commissioner. These spaces having a roof over the entire space may have roof construction and ceilings of non-rated fire resistive materials.

(i) Two-hour fire-rated construction with 1 1/2-hour fire rated, self-closing fire doors are required at:

Boiler, heater or furnace rooms;
Refrigeration, electrical, and equipment rooms;
Incinerator rooms;
Storerooms for fuel, flammable liquids and gas powered equipment;
Transformer vaults.

(ii) Required fire doors shall be maintained in a normally closed position and not held open by fusible links.

(iii) Combustible attic space shall not be used for storage.

(c) Accident Protection. (1) Glazing of panels and doors shall be with safety glazing materials as follows, unless glazed areas are protected by approved grilles, or rails:

(i) Interior exit doors, exterior exit doors and immediately adjacent sidelights - except where glazing is 48 inches or more above the floor;

(ii) All glazed panels where glazing is within 18-inches of the floor, or platform level of music room type risers;

(iii) Gymnasiums and playrooms and elsewhere where subject to physical abuse;

(iv) Acceptable safety glazing materials shall be at least 1/4-inch thick wire glass, 1/4-inch tempered (heat treated) glass, 1/4-inch laminated safety glass, or approved plastic materials.

(2) Glazed doors and sidelights within 6 feet of such doors shall be marked by appropriate means in accord with the provisions of Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York, Part 47, except marking on door and/or sidelight is not required:

(i) where less than 80% of the area of the door or sidelight above a reference line 18 inches above the floor is glazed;

(ii) where width of sidelight is not more than 20 inches, with 1 3/4-inch minimum opaque stiles;

(iii) where floor treatment a distance of 3 feet out from a sidelight will deter approach;

(iv) where sidelights are supported on 18-inch minimum height opaque sill and wall construction;

(v) where sidelights are protected by approved 18-inch minimum height permanent barriers such as benches, planters, or guardrails, extending across at least two-thirds of the sidelight.

(3) Window Cleaning. Safety provisions shall be made for persons engaged in window cleaning. Windows shall be cleaned from approved safe surfaces, window sills or ledges, boatswains chairs, or scaffolds, all as defined in Title 12 of the Official Compilation of Codes, Rules and Regulations of the State of New York, Part 21.
(i) A safe surface is a place where the cleaner is working not over 6 feet off the floor or grade and not over 3 feet above a stair run. Ladders may be used generally when the top of the window is not over 35 feet above grade or floor. Window sills and ledges may be used when the window openings are provided with approved anchors for use with safety belts. Approved boatswains chairs and scaffold also may be used.

(d) Mechanical. Mechanical equipment, heat-producing and cooling equipment, auxiliary apparatus and controls, and installation and use of same shall be such as will insure safe operation in accord with applicable recognized standards as determined by the Commissioner and be consistent with efficient energy consumption.

(1) Gas and oil fuel-burning equipment having a capacity of over 400,000 BTU per hour shall be provided with electronic flame safeguard controls which, upon flame failure, shall normally respond in two to four seconds to cut off fuel supply through the burner and main fuel valve.

(2) All primary controls for fuel-burning equipment shall operate on a 120-volt, single-phase, grounded circuit. Such controls generally include the hold-in coil of the motor starter, the solenoid coil for the pilot valve, the solenoid coil for the main fuel valve or the actuator for the motorized fuel valve, the ignition transformer, and the modulator transformer.

(3) Direct fired fuel-burning heating units shall not be used in any space of pupil occupancy.

(4) Unused duct work shall be sealed off at each floor level with fire resistive materials.

(5) Ventilation with fresh air shall be available in all spaces of pupil occupancy.

(e) Water and Sanitation. (1) An adequate supply of safe, potable water for drinking shall be dispensed from approved sanitary drinking fountains.

(2) Toilet rooms for boys and girls with flush toilets and wash sinks which are connected to an adequate water supply under pressure, and connected to an approved individual or public sewage disposal system shall be provided.

(3) No source of water supply, nor sewage-disposal system, shall be used which has not been approved by the appropriate agency of the State Department of Health or Department of Environmental Conservation.

(f) Gas. (1) Gas entering a school building shall be low pressure gas.

(2) Gas transmission and distribution piping shall meet the requirements of the Public Service Commission.

(g) Electrical. Electrical equipment and auxiliary apparatus and controls, and installation and use of same shall be such as will insure safe operation in accord with applicable recognized standards as determined by the Commissioner and be consistent with efficient energy consumption.

(1) Suitable and sufficient artificial light shall be provided for the visual tasks being performed.

(2) Exit Lights. School buildings shall be provided with exit lights to identify building exits, stairs, corridors, and exits from places of assembly, and to designate the path of travel to the exterior, except school buildings having six or less classroom areas may have exit signs in place of exit lights.

(i) The word "EXIT" shall be in letters not less than 4 1/2 inches high and strokes not less than 3/4 inches wide.

(ii) Exit lights shall be circuited and wired to minimize the possibility of interruption.

(3) Emergency Lighting. Automatic emergency lighting systems shall be provided for places of assembly exceeding an area of 1800 square feet and for all exitways leading from such areas. Such areas include all-purpose rooms, auditoriums, cafeterias, group-instruction rooms, playrooms and gymnasiums, swimming pools and other combination places of assembly.

(4) Fire Alarm. (i) School buildings of seven or more classroom areas shall be equipped with a manually operated electric fire-alarm system, which may include automatic smoke and/or fire detection, which will continue to sound the alarm until the tripped station has been restored to normal operation or, in an existing system, has completed a cycle of not less than 30 seconds.

(ii) School buildings of one-to six-classroom areas shall be equipped with either a manual, hand or electric, fire alarm which is capable of being sounded for such a period of time as will insure evacuation of the building, or an electric fire-alarm system as described in subparagraph(i)of this paragraph.

(iii) School buildings within fire districts having an electrically operated general municipal fire-alarm box system shall have, wherever practical, the school building fire-alarm system interconnected to the municipal system so that sounding of the school building fire-alarm system automatically gives the alarm to the fire department affording protection to the school building. A fire alarm box compatible with the municipal system and which will sound the alarm of both the municipal and school building systems shall be accessibly located on the site or on the school building.

(5) Telephone. A telephone which can be used in the case of emergency shall be provided in all buildings having pupil occupancy.

(h) Additions and Alterations. In the case of additions to or alterations of an existing facility, the requirements of this section must be continuously maintained during the construction period or provisions made to provide equivalent safety to the school-district-occupied portions of the facility.

(i) Facilities shall be operated and maintained to provide effectively for the accident protection and life-safety of occupants, to reduce exposure to property loss by fire, and to assure efficient use of natural resources.

(j) When, based on these regulations, it is the judgment of the Commissioner that the general conditions of a school building, or any part thereof, indicate that it would be detrimental to the health and safety of occupants, the Commissioner may designate an area or areas of the building as unusable for pupil occupancy or may limit the number of occupants thereof.

Section 155.4 Temporary school quarters shall be approved annually by the Commissioner. (a) Except in city school districts of cities having one hundred twenty five thousand inhabitants or more, facilities not owned by a school district or not approved to house pupils on a permanent basis, shall not be used by the school district to house pupils without the annual approval of the Commissioner of use of the facility as temporary quarters.

(b) Temporary school quarters shall comply with those requirements of permanent facilities deemed necessary by the Commissioner to insure educational adequacy and the health and safety of occupants.

(c) Application for approval of use of temporary quarters shall be submitted to the Commissioner in accordance with procedures set forth by the Commissioner.

APPENDIX E

ADVANCEMENT OF PLANS THROUGH THE DIVISION

1. MAJOR PROJECTS
2. SMALL PROJECTS
3. SQUARE FOOTAGE COMPUTATIONS

1. MAJOR PROJECTS

The procedure outlined in this leaflet for the advancement of plans through the Division of Educational Facilities Planning is designed to achieve the following objectives:

School plant needs of the district be determined by a careful and objective study, including selection of site.

Building plans to meet the needs of the district contain suitable and adequate accommodations for the district's educational program.

The board of education has knowledge of the character and quality of the proposed building before it commits itself to the advancement of the project beyond preliminary plans.

All elements entering into the cost of the project are carefully studied and brought to the attention of the board of education before the people of the district are asked to appropriate funds for the project. This will include studies to select proper materials which affect the cost of operating and maintaining the structure during its lifetime and the cost of insurance.

Final plans and specifications will receive the Commissioner's final approval with a minimum of delay and change.

STUDY OF SCHOOL PLANT NEEDS

An educational program which defines the type and extent of program necessary to provide for present and future needs of the district must be developed. With this program and information on present and projected school population, required building facilities--renovation, additions, and new construction--can be determined.

The publication--"A Guide to Administrative Procedures for School Building Projects"--Pamphlet #17, of this division, contains much information for a district contemplating a building project.

The site for new construction must be selected after evaluation of many factors. "School Site Standards, Site Selection and Site Development", published by this division, identifies several of these factors. Approval of the proposed site must be obtained by a completed "Application for Examination and Approval of a School Site" (form EFP-S) to this division for consideration. This should be done in the early stages of a project and at least at the time of submission for approval of preliminary plans.

School districts faced with building needs should contact the Division of Educational Facilities Planning early in the planning for a building. A recommended schedule of the facilities and spaces necessary to best house a district's program, including mandated requirements, will be prepared in cooperation with the division.

With this schedule, the architect or engineer is able to proceed with developing schematic solutions. It is strongly urged that a joint meeting of school officials, representatives of the board of education, their architects, and members of this division be held before a final scheme is decided upon. In this way criticisms, objections, and suggestions may be considered prior to approval of a plan by the board of education. This early preliminary review can avoid delays in approval of the formal preliminary submission.

When the architect or engineer has been retained, a copy of the contract between him and the board of education shall be filed with the division.

When the construction is an alteration or addition to an existing building, form EFP-E, "Evaluation of Existing Building", reporting on the construction and condition of the existing building must be made out. This should be done during the early stages of the preliminary drawings and must be submitted at the same time as the submission of preliminary drawings. Work necessary to correct "non-conforming" items indicated on form EFP-E must be incorporated in the drawings.

PRELIMINARY PLANS

Preliminary drawings, based on the recommended schedule of facilities and spaces, should be prepared by the architect or engineer and submitted to the Division of Educational Facilities Planning, with completed form EFP-P, "Application for Examination and Approval of Preliminary Plans". Important points to keep in mind for this submission are:

On plot plan sheet or first sheet showing floor plans, show a miniature key plan of each floor of the building indicating the gross square footage and a summary of square footage computations. In the case of additions, plans and computations must be separate for the existing structure and the addition or additions; and the gross square footage of the existing structure must be indicated.

Each teaching space must be accurately labeled for its intended use. Use has a direct relationship to computing the operational pupil capacity; for instance, if it is approved that the cafeteria is planned to accommodate students in a study hall situation, it should be labeled "cafeteria-study hall". Such dual use of space does in fact increase the capacity of a secondary school.

Show the net square footage of all teaching stations in each such space.

Key letters, symbols, or numerals referring to a table or list of spaces are not acceptable.

Initial sketches and schematic drawings may be single line and show only overall floor plans and room locations; drawings submitted for formal approval of preliminaries must be more definitive with information clearly legible. Generally, approval of preliminary plans is granted with deficient items and comments listed as exceptions--to be accounted for in final drawings and specifications. However, in particular cases, revised or alternate submissions may be necessary before preliminary drawings are acceptable. Drawings for submission should be at a scale of not less than 1/16" and must include:

1. A map of the site showing:

    (a) Orientation.

    (b) Topography and natural features including existing and proposed contours at convenient intervals.

    (c) Location of proposed new building (with possible extensions) and its relation to the present and future grade levels.

    (d) Water, gas, electrical and sewage facilities or service connections.

(e) General scheme of recreation and physical education facilities, primary landscaping features, walks, drives, parking areas, etc. Where more than one building is existing or planned on a single site or contiguous sites, an indication of the planned ultimate use of the site must be included.

(f) Adjacent properties, buildings, streets, highways, etc.

(g) Location of test pits or borings, if available.

2. Plans of all floors, basement, and roof, with doors, exits, windows, and special features indicated. (For an addition, schematic floor plans of the complete building with all spaces labeled as to use and size must be included. These may be at a small scale.)

3. Principal elevations and sections indicating the general character of the exterior and interior architectural design.

4. An outline specification: This is incorporated in the Application for Examination and Approval of Preliminary Plans (EFP-P).

5. A report on the findings from test pits or borings may be included. This report should include cross sections of the pits or borings.

6. Reports of new construction materials and of new mechanical and electrical systems which are being contemplated or which are still in the experimental stage shall be submitted for study and for acceptance by this division. Examples are: flame spreads of, and smoke contributed by new materials; electric heating and air conditioning systems; high temperature hot water systems; heat pumps; variations from common methods of construction and systems.

The architect's estimate of cost must be based on the preliminary drawings submitted. This estimate shall relate not only to the cost of construction but also to all other items essential to the completion of the project, such as professional fees, equipment, site and site development, clerk of the works, etc. This estimate is a part of the Application for Examination and Approval of Preliminary Plans (EFP-P). (Cost estimates for alterations to existing buildings must be separate from estimates for new construction and additions.)

When approval of a project by the Board of Regents is required, due to the amount of indebtedness of a district, a financial study is required. This study should be prepared under the guidance of the Division of Educational Management Services and will include a long term budget encompassing new debt service, possibly additional current expenses and anticipated tax rate for a 5-year period. All districts having building projects are encouraged to take advantage of this type of service available from the Division of Educational Management Services.

Applications to the Board of Regents for approval of voter approved bond issues must be submitted to the Education Department 3 weeks before the meeting of the Board of Regents--usually the fourth Thursday and Friday of the month.

For repair, replacements, and minor alterations preliminary submissions are unnecessary. Only the final plans and specifications need to be submitted. (See "Submission of Plans and Specifications for Small Projects".)

UNFINISHED WORKING DRAWINGS

After preliminary drawings are approved and funds have been authorized, the board of education may authorize the architect or engineer to proceed with the final working drawings for the project.

Where a reaction or decision is required on specific details or a design solution, to expedite approval of final plans and specifications, the Division of Educational Facilities Planning will review unfinished working drawings. The architect or engineer should contact the division when such review is desired. Any major variation in approved preliminary drawings must be brought to the attention of the division.

In the early development of final drawings, 1/4" scale plans and elevations should also be prepared for a typical classroom and all special areas (such as science, homemaking, commercial, music, art (or arts and crafts), industrial arts, agriculture, health suite, auditorium, locker room, and kitchens). Such plans should indicate windows, doors, chalkboards, display boards, cabinets, wardrobes, instructional equipment including mechanical features, and furniture layout. These drawings should be submitted to the division for review. Such planning is not only helpful in preparing schedule and cost estimates for furnishings and equipment, but also will provide opportunity to avoid conflicts with construction and mechanical features in the building.

FINAL WORKING DRAWINGS AND SPECIFICATIONS

When working drawings and specifications and other contract documents have been prepared, they must be submitted to the Division of Educational Facilities Planning in duplicate, with one set of drawings black on white, together with two copies of completed form EFP-F, "Application for Examination and Approval of Final Plans and Specifications", for the Commissioner's approval.

It is IMPORTANT that the title of the project be the SAME on plans, specifications, and application form EFP-F, so that the title on the bond certificate will be made out correctly. If the project is one of "Additions and Alterations" instead of an "Addition and Alteration" this should be clearly indicated in all titles so that the title on the bond certificate will provide the exact wording necessary to satisfy legal requirements.

In the submission of final plans these items should also be kept in mind:

Maximum size of prints shall not exceed 36" x 48".

Leave a bordered blank space not less than 5" high and 7" long on the plot plan sheet or the first sheet showing floor plans directly above or to one side of the title block. This space is for the use of this Division.

On plot plan sheet or first sheet showing floor plans, show a miniature key plan of each floor of the building indicating the gross square footage computations and summary of square footage computations. In the case of additions, plans and computations must be separate for the existing structure and the addition or additions; the gross square footage of the existing structure must be indicated.

Show square footage of all teaching stations in each such space.

Each teaching space must be labeled on the floor plans and must correspond with the approved preliminary plans. If a change has been made this should be noted in a letter accompanying the application.

Each specification cover sheet and each sheet of the drawings MUST bear the seal and signature of the architect or engineer.

Final submissions must contain copies of all drawings including plot plan, floor plans, elevations, sections, and details; also, all mechanical and electrical work with the utility services clearly indicated.

Environmental Conservation Department and Health Department approval of plans and specifications for the following items is required before approval by the Commissioner of Education for the total project can be issued. The appropriate agency of the Environmental Conservation Department or Health Department (State or local) should be contacted by the architect or engineer early in the development of final plans and necessary plans, specifications, and applications filed with them well in advance of submissions to this division. A minimum of 120 days should be anticipated for their review.

Independent water supply systems.

Independent sewage disposal systems. Approval is required both for a new building and an addition which increases either the pupil capacity of the building or the number of sanitary fixtures.

Swimming pools.

Incinerators and heating systems of 1 million BTUs per hour, or more, rated input capacity--regarding air pollution.

It is a matter of law that the appropriate superintendent of highways or commissioner of public works be advised of the location of all temporary and permanent entrances and exits on public highways and of storm drainage plans to be used. A letter must be submitted to the division indicating that such person has been advised.

Also, it is a matter of law that school buildings be designed to facilitate use by the physically handicapped. A letter from the architect must be submitted to the division certifying design in accordance with applicable provisions of the State Building Construction Code. Approval of final plans and specifications by the Commissioner of Education cannot be granted until notices of approval of the Environmental Conservation Department and Health Department, and of advisement of the appropriate highway superintendent or commissioner, and of the letter regarding the physically handicapped have been received.

Copies of all plans and specifications, applications, evaluation forms, reports etc., which are submitted by the architect or engineer to the Division of Educational Facilities Planning must be filed with the Board of Education and superintendent or district superintendent of schools.

Contracts shall NOT be let until plans and specifications have been approved by the Commissioner of Education as required under section 408 of the Education Law.

FORMS REQUIRED ON EACH PROJECT

1.	Application for Examination and Approval of a School Site	EFP-S
2.	Architect's Contract	(copy of)
3.	Evaluation Form (for Existing Buildings	EFP-E
4.	Application for Examination and Approval of Preliminary Plans	EFP-P
5.	Application for Examination and Approval of Final Plans and Specifications	EFP-F

6.	Supplemental Cost Data (see * following)	EFP-C
7.	Addenda	2 copies
8.	Change Orders	3 copies
9.	Certificate of Completion and Acceptance of Building	EFP-CCA

* Supplemental Cost Data (EFP-C)

Four copies of this form are sent to the architect of the district accompanying the Commissioner's approval of the final plans and specifications of new buildings.

On one copy of the four forms sent will be listed the rated capacity as computed by the Division of Educational Facilities Planning. The amount of State aid will be computed based on this rated capacity.

On new buildings (but not new buildings built as additions to existing units) the architect is required to complete these forms and distribute them according to the instructions given in the form heading. The rated capacity, as computed by this division, shall be shown on all the forms; also the areas of the multipurpose, shower-locker rooms and of the auditorium and gymnasium as called for on the last page. From the form returned to this division will come some of the statistical reports mandated by the Legislature or reported to the Federal Government as well as the construction data sheets sent to school boards, architects, and engineers. This form shall be completed and returned within 2 weeks after the contracts are signed.

2. SMALL PROJECTS

The following procedure for SMALL PROJECT submissions has done much to improve data received by this office and has cut down the time required for the processing of approvals of such projects. Increasingly, granting of Commissioner's approval of small projects (such as roof repairs, boiler replacement, electrical work and fire/safety work, etc.) is delayed because of incomplete and defective submissions to this office. This is offered to guide school districts and architects and engineers in preparing proper submissions, thereby expediting processing by the Division. The information outlined is applicable and necessary, whether advertising, bidding, and letting of contracts are handled by the school district or by the architect or engineer, or the work is to be accomplished by school district personnel.

Plans and specifications for work projects having construction costs (not total project cost) of $10,000 or more affecting health and safety of pupils must be approved by the Commissioner.

Plans and specifications for such projects requiring Commissioner's approval must be prepared by a licensed architect or engineer and properly signed and sealed as required by law.

Form EFP-F, Application for Examination and Approval of Final Plans and Specifications, was designed primarily for major building projects. For small projects fully complete only Part I (four pages), including date of appropriation, and cost estimates for additions and/or alterations as applicable. The board of education president and superintendent must sign and date each copy. The architect or engineer must sign and seal each copy.

Generally, plan and specification information submitted to the Division must be as complete and detailed as necessary for contractors to bid and install the work, plus information necessary to evaluate the whole building with regard to minimum health and safety requirements. Such evaluation is discussed later. All contracts for public work (labor and material) involving construction costs of more than $3,500 and purchase contracts (materials, no labor) involving an expenditure of more than $1,500 must be advertised and bid and awarded to the lowest responsible bidder (General Municipal Law S103). Review and approval by the Commissioner will be based on the bid documents, i.e., those documents which form the basis of contract.

Any funds for capital construction must be authorized by the voters at a special referendum or the annual meeting, or, in the case of a city, by resolution of the board of education.

Specifications for public work, because of an executive order by the Governor, must follow the format of the Construction Specification Institute. The CSI main office address is 1717 Massachusetts Avenue N.W., Washington, D.C., with several local chapters throughout the state.

Also, because of executive order, provisions for Affirmative Action Programs must be included in the specifications for projects in Erie County, Nassau and Suffolk Counties and the Binghamton area southern tier.

Specifications for public work must contain, as a matter of law, specific inclusion of the following:

(a) Labor Law (LL) S220, subd. 2, re: 8 hour day, 40 hour week.

(b) L L S220, subd. 3 and S220-d, re: minimum wage rates and supplements.

(c) L L S220-e, re: anti-discrimination.

(d) L L S222, re: preference of New York State citizens.

(e) L L S222-a, re: elimination of dust hazard.

(f) General Municipal Law (GML) requires separate contracts for 1, plumbing and gas fittings; 2, steam heating, hot water heating, ventilating and air-conditioning apparatus; and, 3, electric wiring and standard illuminating fixtures when the total cost of a project exceeds $50,000.

(g) GML S103-d, re: non-collusive bidding certificate.

(h) GML S108, re: Workmen's Compensation Insurance.

(i) GML S109, re: non-assignment of public contracts.

(j) Any limitation or restriction of competition is contrary to GML S103. Specifications must allow for equivalencies. A clause allowing for equivalents--or equal--must be stated in the general or supplementary conditions of the specifications.

Division procedures check for inclusion in the specifications of items b, g and j above.

For a small project to be approved, the total building complex must conform to requirements of the Commissioner regarding health and safety, or the plans include detail for necessary corrective work on non-conforming items. Form EFP-E, Evaluation of Existing Building, is used to evaluate the building and must be fully executed, signed and dated by the architect and submitted for every project. When non-conforming items appear on the evaluation form for which corrective work is not included in the plans and specifications, the chief school officer of the district must send a letter as part of the submission. This letter must record any non-conforming items which are outstanding and indicate what positive commitment has been taken by the board of education to alleviate the condition. Review and consideration of the content of this letter will influence the approval of the small project.

So that pupil capacity may be assigned to each project, thereby enabling building construction aid to be paid to eligible projects, a small scale, sketch plan of all floors of the existing building must be submitted, indicating any changes. This plan must designate each teaching space by subject area and grade level, and indicate the net square footage of each teaching space. The gross area of the total building also must be included. Additionally, such plans should indicate exits, corridors, stairs, doors and windows, etc.

When projects consist of replacement or reconstruction--such as with roofs, parapets, windows, mechanical systems, etc.-- (as opposed to delayed maintenance and repairs, ordinary maintenance, or refinishing) it is essential that the accurate age of the item or system being replaced is reported within the submission.

For any project with work outside of existing walls, a letter from the architect or engineer must be received by the Division indicating that the appropriate highway superintendent has been advised of all temporary and permanent exits and entrances (if any) on public roads, and the storm drainage plans to be used.

Where work involves the water service, sewage disposal system, swimming pool or air pollution, the approval of the appropriate Environmental Conservation Department or Health Department agency must be received before Commissioner's approval can be granted.

With your attention to this detail, Commissioner's approval of small projects should proceed with a minimum of problems and delay--on this end as well as in the district. Without this detail we, unfortunately, must return all data and wait for a complete submission.

The following is a CHECK LIST of items necessary for a complete small project submittal:

1. Application for Examination and Approval of Final Plans and Specifications - Form EFP-F.

   - duplicate copies
   - date of appropriation
   - financial information
   - signatures and seal

2. Complete plans (working drawings) for work to be done.

   - duplicate copies (with at least one set black on white)
   - each sheet signed and sealed

3. Complete specifications for work being done.

   - duplicate copies
   - Construction Specification Institute format
   - legal references
   - cover sheets signed and sealed

4. Evaluation of Existing Building - Form EFP-E.

   - one copy
   - signature and date

5. Letter regarding non-conforming items (of Evaluation Form).

6. Key plan of all floors of building.

   - teaching spaces designated
   - net square footage indicated

7. Letter regarding public roads and storm drainage.

8. Health Department/Environmental Conservation Department approvals.

3. SQUARE FOOTAGE COMPUTATIONS

Square footage required to be reported in both the preliminary and final applications for approval and the Supplemental Cost Data report shall be computed in accordance with the criteria which follows. These computations are used in determining future allowable building capacity and building aid eligibility; therefore, care must be taken to assure accuracy.

Gross Square Footage

The gross area of a building is the sum of all areas of the several floors including mezzanines, intermediate floored tiers, stairwells, penthouses having headroom of 7'-0" or more, and basements having floor slab and 7'-0" or more headroom. Additionally, covered walkways, roofed-over areaways or courts, porches, covered bus loading platforms, and similar areas shall be included in the gross area at one-half their actual area.

All horizontal measurements shall be taken from the exterior face of enclosing walls, at the plane of the floor.

The following shall not be included in gross area computations: basements having no floor slab or less than 7'-0" headroom, pipe trenches, retaining walls, roof overhangs, exterior terraces and courts open to the sky.

Net Square Footage

The net area of individual spaces which is required to be indicated on both preliminary and final plans, and which must be summarized in the category "Classroom" space and "Miscellaneous" space, shall be measured from the inside face of enclosing walls and partitions, i.e., wall thicknesses shall be excluded.

"Classroom" space shall include the net area of all interchangeable and special subject teaching areas, including directly related preparation and equipment storage rooms. Do not include the net area of such spaces as ancillary toilets, wardrobes, or teachers and/or supply closets.

"Miscellaneous" space shall include the net area of miscellaneous educational space such as gymnasiums, gymnasium locker rooms, cafeteria, kitchen and administration, including directly related work rooms, storage, and serving rooms.

"Other" net square footage is determined by subtracting "Classroom" and "Miscellaneous" space from the calculated gross area; such "other" area accounting for wall thicknesses, corridors, general storage, toilet rooms (both individual and gang toilets), custodial and mechanical spaces.

Perimeter

The perimeter of a building shall be the sum of the lineal length of the enclosing walls; including piers, wall extensions and courts; taken at the plane of the floor at each floor level including finished basements.

APPENDIX F

1. COMPETITIVE BIDDING

2. CONTRACT DOCUMENTS

1. COMPETITIVE BIDDING

Except in an emergency, all contracts for public work involving an expenditure of over $3,500 and purchase contracts over $1,500 must be advertised and let out for competitive bidding and the contract awarded to the lowest responsible bidder (section 103, General Municipal Law). (In the case of an emergency, advice and guidance should be obtained from the board's attorney.)

The requirements of competitive bidding is for the benefit of the board of education, not the bidders. However, any limitation of competition is contrary to the law. Specifications for construction cannot be "closed", wherein only the items specified form the basis of the bid. Specifications must allow for "equivalents" wherein the specified kind, type, brand, or manufacturer of an item is regarded as a minimum standard of quality and a bidder, when he so desires, may propose another item for consideration for approval. The acceptance of the equivalent is determined by the owner--through the architect--with the supporting data on equivalency the responsibility of the bidder.

The related subjects of "equivalents", "base-bids", "substitutions", and "or-equal", etc., have generated much discussion and confusion over the years. The following statements may shed some light, but competent legal advice should be obtained where questions exist.

Specifications which do not allow for equivalencies are improper (Fonseca v. Board of Education, 1968, 294 N.Y.S. 2d 952).

Specifications cannot require that the base bid be only on materials specified, with additive or deductive prices to the base bid listed on a "substitution sheet". Equivalent items may be freely bid (Matter of General Building Contractors of New York State, Inc. 8, Education Department Reports, 152). The risk of whether bid equivalents will be accepted is borne by the contractor.

The listing in the specification of two or three or more items presumed to be equal by the architect does not fully satisfy the required competition. Such items may be considered the standard of quality and the proposal of equivalents must be allowed as previously discussed.

Requiring prebid qualification of contractors and subcontractors is improper (17 Op. State Compt. 58, 1962.)

Requiring the listing of subcontractors by the contractor as a condition of award of contract is improper (Matter of General Building Contractors of New York State, Inc., 8, Educ. Dept. Reports, 152.)

With reference to items 1, 2, and 3 above, a clause allowing for equivalents--or equal--must be stated (or restated) in the general or supplementary general conditions of the specification. The following is one form which might be used.

"EQUIVALENTS: Where, in these specifications, certain kinds, types, brands, or manufacturers of materials are named, they shall be regarded as the required standard of quality. Where two or more are named these are presumed to be equal, and the contractor may select one of those items. If the contractor desires to use any kind, type, brand, or manufacture of material other than those named in the specification, he shall indicate in writing, when requested, and prior to award of contract, what kind, type, brand, or manufacture is included in the base bid for the specified items, and when requested, submit information describing in specific detail, wherein it differs from the quality and performance required by the base specifications, and such other information as may be required by the owner."

Architects and engineers, as professional advisors of the owner, should select materials and methods of construction and engineering systems and devices best suited to the owner's purpose and program. Since the building will stand for several decades and many items of mechanical equipment must operate for years after the completion of the construction, it is important that materials and items of good quality, performance, and life expectancy be specified. There are, however, intangibles which cannot be readily specified as a measure of equivalency which are of utmost importance such as dependability, reliability of service, and even good reputation. Based on such criteria, it would be desirable for the owner--through his architect--to have a choice of certain materials and items to be used in the work, but, due to the constraints of the bid law, this is sometimes difficult to do. The General Municipal Law (section 103, subd. 5) does, however, allow for standardization in purchase contracts (not public works contracts) under particular circumstances. Competent legal guidance is necessary in this regard.

The award of a contract shall be made to the lowest responsible bidder, based upon the base bid figure, or, if alternates are included in the bidding and accepted, on the derived figure of base bid and accepted alternates. Although such things as integrity, ability, and past performance influence the selection of "responsible bidder", a pragmatic definition must include a bidder having the financial solvency to obtain bonding.

2. CONSTRUCTION CONTRACTS

The following statutory requirements relate to construction contracts.

The services of an architect or engineer must be used on any public works project costing more than $5,000; and plans and specifications for such public work shall bear the seal and signature of such architect or engineer. Such services are not required for alterations costing $10,000 or less, if structural or public safety is not involved. (Education Law, section 7209, subd. 1, 3 and 7; 7307, subd. 1 and 5-2).

Specifications for public work must contain specific inclusion of the following:

Labor Law

Section 220, subd. 2, re: 8 hour day, 5 day week.

Section 220, subd. 3 and 220-d re: Minimum Wage Rates and Supplements. The schedule of wage rates required for all public work may be obtained from the Department of Labor, Bureau of Public Works, State Campus, Albany 12226.

Section 220-e re: Anti-discrimination, including all subparts.

Section 222 re: Preference of New York State citizens.

Section 222-a re: Elimination of dust hazards.

General Municipal Law

Section 101. When the cost of a public works project exceeds $50,000 provision must be made to allow for independent bidding and award of separate contracts for a) plumbing and gas fitting, b) steam and hot water heating, ventilating and air-conditioning apparatus, and c) electric wiring and standard illuminating fixtures. The general construction contract would commonly be the fourth prime contract although there is no prohibition in law of the number of contracts in addition to a, b, and c which may be let on a project.

Section 103-d re: Non-collusion.

Section 108 re: Workmen's Compensation Insurance.

Section 109 re: Non-assignment of public contracts.

Performance bonds and payment bonds, while not a requirement of statute, must be considered essential from the point of view of good, sound business and can on occasions such as bankruptcy of a contractor, go far towards the successful completion of a project.

Penalty clauses in contracts are not recommended unless the circumstances are quite unusual. Proving damage or loss due to delay in completion of contract is difficult. Most delays, very probably, could be shown to be from causes beyond the control of the contractor. If the responsibility of the contractor has been determined at the time of awarding the contract, there should be no unnecessary delay, because delays penalize the contractor with additional overhead.

APPENDIX G

TEMPORARY QUARTERS

1. GENERAL

   A. Temporary school quarters shall be approved annually by the Commissioner, pursuant to Section 155.4 of the Regulations of the Commissioner. Such facilities must meet specific requirements of educational adequacy and of health and safety prior to approval and occupancy.

2. TYPES OF TEMPORARY QUARTERS

   A. Temporary quarters take many forms; however, for the purposes of the Division, one of three categories applies:

      1. Rented, non-manufactured buildings - which include spaces such as in churches, fire houses, and store fronts, which will never become the property of a school district.

      2. School-owned Spaces - which include converted spaces in school buildings such as basement space, and bus garages which are not approved as permanent school facilities.

      3. Manufactured buildings - which include relocatable units, mobile trailers, pre-engineered and/or prefabricated units which may become the property of a school district.

3. HEALTH AND SAFETY

   A. Rented, non-manufactured buildings (category 1) and school-owned space (category 2) shall meet the provisions of Section 155.3 of the Regulations of the Commissioner. See Appendix D.

   B. Manufactured buildings (category 3) shall meet the same educational and health, safety and comfort requirements as all new educational facilities. Therefore, the total school facility on a site, including the manufactured building(s) must provide adequate ancillary spaces such as library, physical education, special subject areas, and toilets, as well as sufficient acreage for the pupil population on the site. See Parts I through VIII.

4. PROCUREMENT

      1. Procurement of temporary quarters and application for approval of use shall be in accord with procedures established by the Commissioner pursuant to Education Law, Section 1726.

APPENDIX H

FIRE ESCAPES

1. GENERAL

A. A fire escape is an emergency exit leading from a floor, or floors, more than four feet above grade and necessary to correct hazardous conditions which have developed, or have become evident, since the original construction of a building. A building considered fire-safe when built years ago is not necessarily considered fire-safe today. Changes in the use of a building, and research and experience in fire safety, point out hazardous conditions which were not apparent previously. Major problems include:

1. Insufficient stairs for the capacity of the floors.

2. Corridor dead-end conditions.

3. Lack of a satisfactory remote exit.

B. New fire escapes that are required to be added to an existing building shall be designed in accordance with Section 2 following.

C. Existing fire escapes shall at least comply with the following requirements which are marked (**). It is recommended that existing fire escapes be reconstructed as necessary to meet the requirements of new fire escapes.

D. All plans for fire escapes shall be submitted to the Commissioner of Education for approval of design, location and materials.

** E. Fire escapes shall be maintained to insure safe exit at all times.

2. DESIGN CRITERIA

A. Fire escapes shall be continuous and unobstructed, with minimum exposure to existing window and door openings, and provide sufficient units of exit width.

** B. Treads and platforms shall be skid resistant.

C. A fire escape may cross a roof if provided with fully enclosed fire-resistive walkways.

D. Fire escapes shall be self-supporting and designed in accordance with the following minimum loadings:

1. Platforms and landings....100 pounds per square foot

2. Treads.....100 pounds per square foot

E. Sizes and dimensions

1. Stair width.....30 inches, minimum

2. Headroom.....7 feet 6 inches, minimum

3. Tread.....9 inches, minimum

4. Riser.....7 inches, maximum

5. Handrails.....30 inches maximum above nosing, continuous

6. Doors.....as wide as stairs and 6 foot minimum height

7. Door sills.....to be at least 3 inches, but no more than 6 inches, above platform

8. Platforms.....to be as wide as stairs, with length at least twice the width of stairs or exit door

9. Risers.....in one flight....3 minimum, 18 maximum

F. Materials

1. All fire escapes shall be constructed with non-combustible materials. Plastic materials are not permitted. Wood may be used on fire escapes for Class "C" construction, except for walkways across roofs.

G. Hardware

** 1. Door serving a single room requires classroom type hardware.

** 2. Door serving two or more classrooms or a place of assembly requires panic hardware.

H. Glazing

** 1. All glazed areas opening into or below fire escapes, or within 5 feet of a fire escape enclosure in a horizontal direction, shall be of 1/4" wire glass.

** 2. All platforms and all stair runs shall be adequately illuminated for exit travel during daylight hours.

I. Exit signs or lights

** 1. Exit signs or exit lights shall be provided to designate the exit to a fire escape in accordance with Section 155.3(g) of the Regulations of the Commissioner of Education.

J. Enclosures

1. Fire escapes shall be protected from the weather by a canopy and shall be enclosed on all sides to a height of not less than 5 feet measured from the nose of a tread. The enclosing material shall be securely attached to the supporting framework. It is recommended that the enclosure be weathertight and equipped at the bottom with a door having panic hardware which cannot be opened from the outside.

APPENDIX I

DISTRICT ADMINISTRATION BUILDINGS AND SCHOOL DISTRICT PUBLIC LIBRARIES

District Administration Buildings and School District Public Libraries shall be designed and constructed to provide for the health, safety and comfort of the occupants. Rather than developing specific standards for review of these facilities, review of plans and specifications by the Commissioner is based on conformance with recognized standards of good practice.

The requirements of the Manual of Planning Standards are worded specifically for educational occupancies but can be used as a basis for good fire and life safety design practices. The criteria in the manual should be carefully reviewed for application of the principles - if not the precise language - to the planning and construction of District Administration Buildings and school district Public Libraries.

The design categories listed below are considered minimum, are contained in the manual, and must be incorporated in plans and specifications.

1. Remote exits from each floor.
2. Restriction of dead-end corridor pockets.
3. Two means of egress from rooms over 500 square foot area - one of which may be an escape window.
4. Remote exits from rooms over 1500 square foot area.
5. Exiting of Places of Assembly.
6. Hardware for interior exits and exterior exits.
7. Stair enclosures.
8. Smoke control and separation between floors.
9. Provisions for the physically handicapped.
10. Fire resistant enclosure of boiler rooms, flammable liquid storage, etc.

11. Construction materials (Part II).

12. Utilities - services (water, sewage, electricity, gas).

13. Boiler/burner controls, electronic flame safeguards.

14. Plumbing - codes - toilets

15. Electric - code.

16. Exit light system.

17. Fire alarm system.

APPENDIX J

SCHOOL BUS MAINTENANCE AND STORAGE FACILITIES

1. SITE DEVELOPMENT

A. Construction of school bus maintenance and storage facilities is recommended to be on a site separate from a school building site, or if on the same site, as remote from a school building as possible.

1. If on the same site, in addition to the above:

a. The facility shall not be attached to a school building.
b. Bus circulation shall not interfere with safety of pedestrian traffic and access to play areas, or with future building expansion. Bus driveway shall not encircle school buildings.
c. Public and staff parking shall not interfere with free movement of buses.

B. Sites with steep slopes should be avoided. A ten (10) percent slope is the maximum for vehicular traffic.

C. Paving Materials (such as blacktop and concrete) should provide a hard, dry, non-slippery surface. State and county Highway specifications may be used for guidance.

1. Drives generally should be 12 feet wide; 20 feet wide if vehicle pass. Drives should be as short and direct as possible in consideration of initial cost, snow removal and maintenance.

2. Turning circle in front of garage doors should be a minimum of 90 feet diameter; 110 feet diameter is recommended.

3. Lanes and parking areas should be designated with appropriate signs and lines to provide safe and unrestricted bus circulation.

4. Parking area for driver's and mechanic's vehicles should be provided, and at such locations which avoid interference with bus circulation.

D. Landscaping and planting should not restrict vision along drives nor at intersections, nor should it affect snow removal by being too close to the driveway. Screening at site boundaries is recommended when such is desirable due to adjacent land use.

E. Gas Pump Installations should be in a safe, accessible location, preferably remote from the garage building, and well protected from physical damage. Gasoline storage tanks should not be located under drives.

1. Blacktop paving deteriorates when subjected to spilled gasoline. Concrete or gravel should be considered in such locations.

2. DESIGN AND CONSTRUCTION

A. General: School bus maintenance and storage facilities should be designed and constructed to properly house the school district's current bus program and to facilitate future expansion and must afford adequate safety to all occupants of the facility. School districts are urged to avail themselves of the inspection services of all New York State agencies with regard to equipping, arranging, operating and maintaining the facility to reasonably and adequately protect the health and safety of all persons using the facility.

1. New bus maintenance and storage facilities shall be designed in accordance with the following requirements.

2. Existing bus maintenance and storage facilities shall at least comply with the following requirements which are marked (**).

B. Bus Stalls: Depth of bus stalls should be a minimum of 40 feet clear, inside; 78 feet clear if in tandem.

1. Tandem stall layout should be considered if there are over seven stalls.

2. Storage stalls of 12 feet width are generally found to be satisfactory.

3. Repair and wash stalls should be a minimum of 16 feet wide (to facilitate pulling axles) by 50 feet long.

   a. Repair stalls should be provided with at least 10 lineal feet of work bench and tool racks.

4. Storage areas for maintenance and repair items should be located convenient to maintenance facilities.

(**)C. Exits: A minimum of two exits, remote from each other, shall be provided from each general area.

1. Distance of travel to an exit shall not exceed 150 feet.

(**) 2. Doors at required exits shall swing in the direction of egress and shall be equipped with hardware which is always operable from within the building.

3. Door width at required exits shall be a minimum of 36 inches. A pass (wicket) door in an overhead door may be approved as one of the required exits.

4. Exitways shall be unobstructed, with a 36 inch minimum clear width passageway.

D. Walls, Partitions and Roof Construction are recommended to be of fire resistive material; however, serviceable facilities have been built of wood frame construction, pole barn construction and with wood roof. A detailed economic study considering construction, initial costs, operation costs, maintenance, depreciation, insurance, etc. should indicate a suitable type of construction.

1. Bus service (repair) areas shall be separated from bus storage areas by two hour fire-rated construction, with self-closing Class B, fire-rated doors and frames.

2. Overhead construction and/or ceilings should be finished with reflective, light colors.

3. Rooms under mezzanine areas having occasional occupancy should be provided with ceilings having a fire-rated construction rating of at least one hours.

(**)E. Storage Rooms for flammable materials and heater rooms required by section 3-B-1, shall have walls and floor (and ceilings, if there is usable space above) of at least two hour fire-rated construction, with self-closing, Class B fire-rated interior doors and frames. Duct and grille openings shall be provided with fusible link fire dampers.

1. Doors of heater rooms should open directly to the exterior.

(**) 2. Combined storage and heater rooms are not recommended; however, in no case shall storage occur within four feet of the heating unit burner side, nor within 1'-6" from the other sides of the heating unit.

(**)F. Floor Surface of maintenance facilities should be hard, dry, non-slippery, nondusting, low in maintenance and properly pitched to drain.

1. Concrete floors should be designed to withstand the applied loads and serious consideration should be given to the location of expansion and contraction construction joints. Surfaces shall be treated with curing or sealing compounds to diminish dusting. Painting of concrete floors is seldom necessary.

2. Floors of storage rooms containing flammable liquids should be constructed so as to confine any spillage of such liquids.

G. Toilet and Wash Facilities: Separate toilet room shall be provided for each sex, with no direct connection between the rooms. A minimum of one lavatory shall be provided in the toilet room for each water closet unless washing facilities are provided in the work area in proximity to the toilet room(s).

(**) 1. Construction shall be solid from floor to ceiling, minimum clear height 7'-6" with top ceiled over.

(**) a. Walls, ceilings and compartment partitions shall be of non-absorbent material, or finished with light-colored water-repellent finish.

(**) b. Floor and base shall be of non-absorbent material at least equal to waterproofed cement. Base shall be 6" minimum height, coved at the bottom.

(**) c. Doors shall be unglazed, self-closing, with lock or latch, and hung so as to screen the interior from view.

(**) d. Water closets shall be enclosed in individual compartments if there are more than one, or if a water closet and one or more urinals.

(**) e. Every urinal shall be installed with integral sides, or supplementary screens, for privacy.

H. Dual-post Hydraulic Lift of 10 ton minimum capacity should be provided in a repair stall. Clear height above the lift must be increased over normal roof height - usually 4'-6" +.

1. Grease pits are less desirable than hydraulic lifts and are not common to new bus garage construction. However, if used, a grease pit should be 4 feet in depth, 40 feet minimum in length, 3'-6" minimum in width between side walls, and have both ends rounded. Pits should be protected by a 6 inch high concrete or steel curb around the perimeter, and equipped with adequate remote stairs. Recessed storage facilities should be provided at pit floor level. Pits should also be provided with a drain, or sump and sump pump.

I. An Overhead Track and chain hoist assembly of one ton minimum capacity should be considered at the repair stall to facilitate pulling motors.

(**)J. Open-sided Floor Areas more than four feet above the main floor, or from which a person can accidentally drop, shall have the open sides guarded by 42 inch (minimum) high railings with intermediate rail or balusters, and a 4 inch high toeboard. An intermediate rail and toeboard is not required on platforms used for storing materials which are regularly passed over the edge. Two remotely located permanent stairs or ladders shall be provided to reach the upper level.

(**) 1. Exterior wall door openings four feet or more above grade shall be protected by railings.

(**) 2. Stairs shall be guarded on open sides by 36 inch high railings with intermediate rail or balusters.

(**) 3. Stairs shall have non-slip treads.

4. No access shall be provided to space under stairs.

K. Overhead Doors are recommended to be a minimum of 12 feet high. An 11 foot width is recommended. Double width doors (20 foot minimum) should also be considered.

1. Overhead doors should be glazed with clear wire at eye level.

2. Bumpers or wheel guards at door jambs are desirable, but not essential. Guards at free standing interior columns are essential.

(**)L. Fire Extinguishers shall be provided, - a minimum of one for each repair stall and one for each four storage stalls, all suitable for Class B and C fires.

1. Extinguishers shall be located remote from each other and in proximity to service area exits and adjacent to high hazard areas.

(**)M. Spray Painting facilities in a bus garage should generally be restricted to infrequent "touch up" work, in which not more than an aggregate of one quart of spray coating material is used in any one day. Such work does not generally constitute a health hazard and the small amounts of flammable liquid materials stored and used generally do not produce an uncommon fire hazard. The spray operator must, however, use personal respiratory protective equipment of a type specifically designed for paint spraying.

Materials and/or methods which produce dangerous air contamination should be avoided. Large-scale painting operations usually produce dangerous air contamination which must be controlled or removed. Special provisions required to protect health and to provide fire safety result in costly installations. This dictates that ONLY those districts whose bus operation is large enough to warrant the additional costs should consider complete spray painting facilities. Specific requirements for complete spray painting facilities may be obtained from 12NYCRR 12 and 18. Such facilities must also be U.L. listed.

(**) 1. Storage of flammable liquids and application of same shall be in rooms of fire-rated construction as required by section 2.E.

(**) 2. Fire extinguishers shall be provided at exits of rooms used for storage, and for application of flammable liquids.

N. Engine Heaters: Enclosed bus storage stalls generally prevent vandalism and theft, eliminate cold motors with associated hard starting and excessive wear. However, engine heaters have been satisfactorily used by some districts in lieu of enclosed bus storage facilities.

1. Engine heaters are generally of two types.

a. Electrically operated, thermostatically controlled external type heaters which when connected in series with the engine cooling system, circulate the coolant by gravity through the engine block. Integral pumps are available for positive forced circulation.

b. Circulated anti-freeze. A remote reservoir of anti-freeze is heated (by gas or oil) and pumped through a piped system. Branch lines couple to the individual vehicles.

3. MECHANICAL

A. Plumbing:

1. All plumbing work shall be in accord with The New York State Building Construction Code applicable to Plumbing.

2. Toilet and wash facilities shall be provided for drivers and mechanics. See section 2.G.

3. A supply of drinking water shall be provided. Use of drinking fountains is recommended. Use of disposable paper cups, etc. is acceptable. Use of a common cup, etc. is prohibited.

4. Water supply and sewage system shall be approved by the New York State Department of Health or Department of Environmental Conservation, as applicable.

5. Hot and cold water should be provided at wash stalls, preferably through mixing-type hose bibs.

a. Detergent dispensing systems are available for consideration of use.

6. A cold water hose bib should be provided for each two storage stalls.

7. Floor drains should be provided: 1 for each storage stall and each repair stall, 2 for each wash stall. A continuous gutter can be used in lieu of the above.

a. Grease traps should be installed in floor drain lines connecting to sanitary or municipal drainage systems.

b. Flammable liquids shall be prevented from entering the building drainage system.

(**)B. Heating: In maintenance areas and toilet rooms the heating system shall be capable of maintaining 60 degrees, F., minimum. Bus storage areas need only to be maintained above freezing. All controls and accessories necessary to insure safe operation shall be included in the system, including all primary controls on a 120 volt, grounded circuit. Installation shall be in accord with requirements of the National Board of Fire Underwriters.

(**) 1. Heating units, burning fuel, having an individual or combined rated gross capacity in excess of 250 mbh. and operating at 15 psi. pressure or less shall be enclosed in two-hour construction. See section 2.E. Enclosure of all heating units is recommended.

(**) 2. Direct fired unit heaters (space heaters) may be used without enclosures if openings for air in the heater which come in contact with the flame, and the flame proper, are at least 8 feet above the floor.

(**) 3. Where the heating system includes a boiler, the construction, installation, operation and maintenance of such boiler and supplemental equipment shall comply with the provisions of 12 NYCRR4, to adequately protect the health and safety of persons frequenting the facility.

4. Areas for storage of flammable liquids and for application of same (see section 2-M) shall be heated only by wet system radiation, or indirect forced warm air.

(**)C. Ventilation shall be provided to reduce air contamination to safe levels and to provide an acceptable environment. General ventilation may be by infiltration and gravity exhaust or by mechanical systems where positive circulation is desired.

(**) 1. Toilet rooms shall be ventilated. A window opening to the exterior is acceptable at a rate of one square foot of openable area for each water closet or urinal. Mechanical ventilation is acceptable at a rate of 35 cfm for each water closet or urinal with positive means of intake air.

(**) 2. Motor vehicle fumes shall be exhausted at each servicing location by a duct or 3" minimum diameter flexible pipe, fitting tightly over the tail pipe and/or deflector, which discharges outdoors at a minimum rate of 100 cfm when not connected to tail pipes. Total capacity for a system shall be based on the total number of branch ducts; except that, where there are over four branches, and each branch has automatic closing caps, additional capacity may be based on 50% of the number of branches over four.

(**) a. Where there are no more than two servicing locations, a gas tight duct or flexible pipe of a diameter at least equal to the tail pipe, fitting tightly over the tail pipe, may be used providing the duct length shall not exceed 20 feet to termination outside.

(**) 3. Welding, flame cutting, etc. shall be provided with local exhaust ventilation to maintain at least 50 fpm. velocity in the breathing zone of the operator, or 100 fpm. air flow at the welding arc, etc. toward a fixed or movable hood which discharges outside.

a. Proper goggles or shields must be worn when performing the above operations.

4. See section 2M for Spray Painting.

D. Electric:

(**) 1. All electric work shall be in accord with the National Electric Code.

2. Electric service should be 220 volt with a minimum 100 amp entrance switch. Three phase service should be considered if available.

3. Permanent electric installations four feet or less above the floor shall be explosion proof. Installations above 4 feet need not be explosion proof, except as below.

(**) a. Electric wiring and equipment in rooms used for storage of flammable liquids, and within 20 feet of work areas used for the application of same, shall be in sealed, rigid metal conduit with explosion proof fittings.

(**) b. Electric lighting in storage rooms and work areas as in 3.a. above, shall be totally enclosed types and protected against breakage. Lamp sockets shall be non-metallic and of the switchless type.

(**) c. Switches, other than explosion proof type, shall be at least 20 feet from work areas for the application of flammable liquids and outside storage rooms for same.

4. A duplex outlet should be provided for each repair stall; for each two bus storage stalls.

(**) 5. Flexible electric cords shall be three conductor, extra heavy service type, insulated and grounded.

(**) 6. Adequate lighting shall be provided to illuminate all areas during working hours.

a. Lighting in bus storage areas should be over the aisles between buses.

b. Properly placed lighting in service areas, (such as industrial type fluorescents) will be advantageous; however, supplemental portable lighting will be necessary. Portable lighting shall be protected from breakage.

c. Exterior flood lighting to discourage vandalism should be considered.

7. Exit lights shall be installed at all required exit doors. Exit lights should be on a separate circuit energized on the service side of the main distribution panel.

4. OPERATIONS:

The following items will be among those requirements of the Department of Labor that will be reviewed by their Inspectors.

A. All machinery, equipment and devices in bus maintenance and storage facilities shall be so placed, operated, guarded and lighted as to provide reasonable and adequate protection to all persons therein.

1. Flywheels, cranks, connecting rods, revolving governor balls, gears, friction drives, sprockets and chains, etc., except where guarded by their location, shall be enclosed in such a way as to prevent accidental contact with them.

2. On all machines where a moving part leaves less than 18 inches space between another machine or between a wall or any other stationary object when it reaches the limit of its travel, such part, if exposed to contact, must be guarded or the space shall be barred against passage.

3. Guards shall be constructed and installed in a substantial manner. Ordinary fragile glass shall not be used as a guard or in any part of a guard.

4. Substantial barriers or screens of suitable height and width shall be provided where necessary to protect persons from flying objects.

5. Grinding, polishing, buffing, scratch brushing, abrasive cutting-off wheel, grinding or polishing belt strap operations, woodworking operations, and vessels operated at or in excess of the temperature of volatilization of toxic metals, generating dangerous air contaminants shall be provided with local exhaust ventilation and air cleaning devices.

B. All waste material of a flammable nature shall be deposited in metal-lined boxes with covers either self-closing or automatically closed through the action of fusible links.

C. Suitable receptacles shall be provided, and used in each toilet room for the storage of waste and refuse and shall be maintained in a sanitary condition. Receptacles used for moist or liquid waste shall be made of metal or glazed earthenware, or be metal lined, and shall not leak. They shall be kept covered, and shall be washed out as often as necessary to keep them clean.

D. Floors shall be maintained, so far as possible, in a dry condition. When wet processes are used the floor shall be drained free of liquids, but whenever a floor cannot be thoroughly drained, platform mats or other dry standing space shall be provided wherever practicable.

E. Periodically review requirements of the National Electric Code as they apply to expendable items such as a rubber mat under a main power switch, grounded electrical cords to portable equipment, damaged drop cords, etc.

F. Periodically review for possible damage to required safety items such as removal of floor plates for hydraulic lift recesses, damage to protective goggles used at certain machinery, worn and damaged parts of portable equipment, etc.

APPENDIX K

MAINTENANCE AND STORAGE FACILITIES

1. SITE DEVELOPMENT

A. Construction of school district maintenance and/or storage facilities is recommended to be on a site separate from a school building site or, if on the same site, as remote from a school building as possible.

1. If on the same site, in addition to the above:

a. Construction shall not be attached to a school building.
b. Vehicular circulation shall not interfere with safety of pedestrian traffic and access to play areas, or with future building expansion.

2. DESIGN AND CONSTRUCTION

A. General: School district maintenance and/or storage facilities shall be designed and constructed to afford adequate safety to all occupants of the facility.

1. Design should consider office space, lavatory and toilet facilities as well as the possibility of women occupants.

B. Exits: A minimum of two exits, remote from each other, shall be provided from each general area.

1. Distance of travel to an exit shall not exceed 150 feet.

2. Doors at required exits shall swing in the direction of egress and shall be equipped with hardware which is always operable from within the building.

3. Door width at required exits shall be a minimum of 36 inches. A pass (wicket) door in an overhead door may be approved as one of the required exits.

4. Exitways shall be unobstructed, with a 36 inch minimum clear width passageway.

C. Walls, Partitions and Roof Construction are recommended to be of fire resistive material; however, serviceable facilities have been built of wood frame construction, pole barn construction and with wood roof. A detailed economic study considering construction, initial costs, operation costs, maintenance depreciation, insurance, etc. should indicate a suitable type of construction.

D. Storage Rooms for flammable liquids and heater rooms shall have walls and floors (and ceilings, if there is usable space above) of at least two hour fire-rated construction, with self-closing, Class B fire-rated interior doors and frames. Duct and grille openings shall be provided with fusible link fire dampers.

1. Doors of heater rooms should open directly to the exterior.

2. Combined storage and heater rooms are not recommended; however, in no case should storage occur within four feet of the heating unit burner side, nor within 1'-6" from the other sides of the heating unit.

E. Floor Surface should be hard, dry, non-slippery, nondusting, low in maintenance and properly pitched to drain.

1. Concrete floors should be designed to withstand the applied loads and serious consideration should be given to the location of expansion and contraction construction joints. Surfaces shall be treated with curing or sealing compounds to diminish dusting. Painting of concrete floors is seldom necessary.

F. Open-sided Floor Areas more than four feet above the main floor shall have the open sides guarded by 42 inch (minimum) high railings with intermediate rail and 4 inch high toeboard. An intermediate rail and toeboard is not required on platforms used for storing of materials which are regularly passed over the edge. At least two remotely located permanent stairs or ladders shall be provided to reach the upper level.

1. Exterior wall door openings four feet or more above grade shall be protected by railings.

2. Stairs shall be guarded on open sides by 36 inch high railings with intermediate rail.

3. Stairs shall have non-slip treads.

G. Fire Extinguishers shall be provided, all suitable for Class B and C fires.

1. Extinguishers shall be located remote from each other and in proximity to exits and adjacent to high hazard areas.

H. Spray Painting facilities should generally be restricted to infrequent "touch up" work in which not more than an aggregate of one quart of spray coating material is used in any one day. Such work does not generally constitute a health hazard and the small amounts of flammable liquid materials stored and used generally do not produce an uncommon fire hazard. The spray operator must, however, use personal respiratory protective equipment of a type specifically designed for paint spraying.

Materials and/or methods which produce dangerous air contamination should be avoided. Large-scale painting operations usually produce dangerour air contamination which must be controlled or removed. Special provisions required to protect health and to provide fire safety result in costly installations. Specific requirements for complete spray painting facilities may be obtained from 12 NYCRR 12 and 18. Such facilities shall be U. L. listed.

1. Storage of flammable liquids and application of same shall be in rooms of fire-rated construction as required by section 2 D.

2. Fire extinguishers shall be provided at exits of rooms used for storage, and for application of flammable liquids.

3. MECHANICAL

A. Plumbing:

1. All plumbing work shall be in accord with the New York State Building Construction Code applicable to Plumbing.

2. When a supply of drinking water is provided, use of drinking fountains is recommended. Use of disposable paper cups, etc. is acceptable. Use of a common cup, etc. is prohibited.

3. Water supply and sewage system shall be approved by the New York State Department of Health or Environmental Conservation, as applicable.

B. Heating: A heating system shall maintain 60 degrees, F., minimum, in maintenance and toilet areas. All controls and accessories necessary to insure safe operation shall be included in the system, including all primary controls on a 120 volt, grounded circuit.

1. Heating units, burning fuel, having an individual or combined rated gross capacity in excess of 250 mbh. and operating at 15 psi. pressure or less shall be enclosed in two-hour construction. See section 2 D. Enclosure of all heating units is recommended.

2. Direct fired unit heaters (space heaters) may be used without enclosures if openings for air in the heater which come in contact with the flame, and the flame proper, are at least 8 feet above the floor.

3. Where the heating system includes a boiler, the construction, installation, operation and maintenance of such boiler and supplemental equipment shall comply with the provisions of 12 NYCRR4.

4. Areas for storage of flammable liquids and for application of same (see section 2-H) shall be heated only by wet system radiation, or indirect forced warm air.

C. Ventilation shall be provided to reduce air contamination to safe levels and to provide an acceptable environment. General ventilation may be by infiltration and gravity exhaust or by mechanical systems where positive circulation is desired.

1. Welding, flame cutting, etc. shall be provided with local exhaust ventilation to maintain at least 50 fpm. velocity in the breathing zone of the operator, or 100 fpm. air flow at the welding arc, etc. toward a fixed or movable hood which discharges outside.

a. Proper goggles or shields must be worn when performing the above operations.

D. Electric:

1. All electric work shall be in accord with the National Electric Code.

2. Where gas powered equipment and/or volatile fumes will occur in a facility, permanent electric installations four feet or less above the floor shall be explosion proof. Installations above four feet need not be explosion proof, except as below.

a. Electric wiring and equipment in rooms used for storage of flammable liquids, and within 20 feet of work areas used for the application of same, shall be in sealed, rigid metal conduit with explosion proof fittings.

b. Electric lighting in storage rooms and work areas as in 2.a. above, shall be totally enclosed types and protected against breakage. Lamp sockets shall be non-metallic and of the switchless type.

c. Switches, other than explosion proof type, shall be at least 20 feet from work areas for the application of flammable liquids and outside storage rooms for same.

3. Flexible electric cords shall be three conductor, extra heavy service type, insulated and grounded.

4. Adequate lighting shall be provided to illuminate all areas.

   a. Properly placed lighting in service areas, (such as industrial type fluorescents) will be advantageous; however, supplemental portable lighting will be necessary. Portable lighting shall be protected from breakage.

5. Exit lights shall be installed at all required exit doors. Exit lights should be on a separate circuit.

APPENDIX L

OCCUPATIONAL EDUCATION SPACES - (Requirements For New Construction)

The nature of programs, and the size and use of facilities common to occupational educational centers differ from the general education courses, such as industrial arts and homemaking, found in secondary schools. Similar to general education spaces, occupational education spaces are teaching facilities as opposed to commercial, production type operations. Students in occupational education are closely and continuously supervised, and the use and maintenance of equipment and facilities is closely controlled--instruction in proper and safe procedures being part of the education process.

To further assure the health, comfort and safety of occupants, the following requirements, generally in addition to requirements contained in the Manual of Planning Standards of the Division of Educational Facilities Planning, apply to all new construction of occupational spaces.

1. Vision Requirements: For all teaching spaces the 50% vision panel requirement applies. Window stool height in classroom areas such as business and child care shall not exceed 32 inches; in areas such as cosmetology, nursing, and drafting - 44 inches; in shop areas - 60 inches. In all cases, the minimum head height is 6'-0".

2. Exits: Due to size and shape of many of the spaces, approval of exiting is facilitated by including an exterior door from each space. When, due to size, two doors from a space are required they shall be as remote as possible and, normally, into separate smoke zones. A pass door in an overhead door is approvable; however, a pedestrian door is preferred.

3. Building Service Equipment Rooms:

   (a) Building service rooms which house electrical equipment having contacts, arcs, etc., or housing boilers, furnaces, or hot water heaters which have open flames shall be provided with a 2 inch (minimum) high curb at interior entrances to the building service room unless the building service room floor is at least 2 inches above finished floor of automotive shops (as defined).

   (b) Building service rooms housing open flame equipment shall be of 2 hour fire rated construction with 1 1/2 hour self-closing Class B fire doors.

4. Shops, General:

(a) Where operations within a program produce dust or fumes, specific precautions shall be taken to avoid harmful and unsafe concentrations in the air. See specific type shop.

(b) Lighting fixtures shall be of a type in which the surface temperature of the tube or lamp does not exceed 165°C.

(c) Fixtures and lamp holders need not be totally enclosed; however, tubes and lamps shall be shielded or guarded to protect against breakage.

(d) Electrical conduit, outlets, equipment, etc., as much as practical, shall be at least 18 inches above the finished floor of the shop. (4 feet above finished floor is preferred.)

(e) The following requirements for specific type shops apply to the specific room, not adjoining rooms.

5. Mezzanine Storage:

(a) Mezzanines shall not be occupied by students on a regular basis. Where an upper area is to be occupied by students on a regular basis, it shall meet all requirements of a "floor".

(b) Storage mezzanines shall be provided with two means of egress remotely located. The primary exit shall be a stairway or a "ships ladder". The second exit may be a permanently installed vertical ladder.

(c) Open sides of a storage mezzanine shall be protected by a 42 inch(minimum)high railing with middle rail.

6. Shops - Fire Rated Construction: Shops which present increased exposure to the risk of fire shall be separated from other areas within the building and from each other if not containing related program by at least two hour fire rated construction and 1 1/2 hour self-closing Class B fire doors.

Such areas include, but are not limited to: heating and refrigeration shops where units and related controls are operated for instruction purposes; gasoline engine service shops; automotive and agricultural shops in which vehicles are to be serviced and/or repaired; finishing rooms; and storage rooms for flammable liquids and gases.

7. Woodworking Shops:

   (a) Woodworking machines and portable tools shall be provided with shaving and/or dust collection devices inherent within each machine, or an overhead vacuum collection system serving all machines and tools.

   (b) Motors shall be the totally enclosed type.

   (c) Motor starters shall be dust-tight.

   (d) Plugs and receptacles shall be dust-tight or rigid-to-flexible permanent connections shall be provided.

   (e) Plug-in bus duct overhead will be allowed.

8. Paint Spray and Finishing Rooms:

   (a) Finishing rooms for brushing, spraying and/or storage of paint, etc. shall be of 2 hour fire rated construction with 1 1/2 hour, self-closing, Class B fire doors.

   (b) Such rooms shall be provided with U. L. approved non-arcing switches and explosion-proof motors, outlets and fixtures.

   (c) Positive ventilation shall be provided.

   (d) Package paint spray booths(for smaller projects)shall be U. L. approved and need not be located in a finishing room.

   (e) Vehicular spray booths shall be constructed to meet U. L. standards. (Additional two hour fire rated wall is not required to be constructed around vehicular spray booths.)

9. Automotive Shops: Automotive shops include any shop in which internal combustion engines are serviced and/or repaired. Such areas include, but are not limited to, auto-body, auto-repair, agricultural mechanics and small engine repair shops.

   (a) Electrical outlets, equipment, etc. shall be at least 18 inches above the finished floor of the shop(4 feet above finished floor preferred), except installations which can only be below the 18 inch limit, shall be explosion-proof and conduits in or below the 18 inch limit shall be rigid type with wrench tight connections. Conduit which terminate in or pass through the 18 inch limit shall be sealed.

(b) An overhead mechanical carbon monoxide exhaust system (not under floor) shall be installed in all areas where vehicles will be repaired, serviced or operated.

10. Gasoline: Gasoline storage tanks and pumps shall be at least 20 feet away (outside) from any building.

11. Welding and Grinding: Welding and grinding operations shall be provided with positive ventilation with hoods and exhaust duct and collecting systems.

12. Kitchens: Kitchens used for teaching purposes shall have an exhaust hood, complete with an automatic carbon dioxide or dry chemical fire extinguishing system, over ranges, ovens, deep fat fryers, etc. The system shall be interconnected with the fire alarm system to sound the fire alarm system upon activation of the fire extinguishing system.

13. Electrical Floor Outlets: Provision of electric floor outlets throughout a facility should be minimal--being provided only where required by the program use of a space. Outlets provided shall be dust-proof.

APPENDIX M

Providing for the PHYSICALLY HANDICAPPED in Schools

The Laws of 1972 have been amended in relation to making public buildings and facilities accessible to physically handicapped persons. All public buildings (which include public schools) are required to conform to the requirements of the State Building Construction Code relating to facilities for the physically handicapped, except those buildings already constructed, in the process of being constructed or for which schematic designs have been approved by September 1, 1972.

Within the law, physically handicapped is defined as -

(a) Impairment requiring confinement to a wheelchair; or

(b) Impairment causing difficulty or insecurity in walking or climbing stairs or requiring the use of braces, crutches or other artificial supports; or impairment caused by amputation, arthritis, spastic condition or pulmonary, cardiac or other ills rendering the individual semi-ambulatory; or

(c) Total or partial impairment of hearing or sight causing insecurity or likelihood of exposure to danger in public places; or

(d) Impairment due to conditions of aging or in-coordination.

IMPORTANT: As a condition to final approval by the Commissioner of Education of plans and specifications for school building projects, a letter must be received from the architect or engineer of the project certifying that the project incorporates the applicable provisions of Section C-215, "Facilities for the Physically Handicapped" of the State Building Construction Code.

For information, the appropriate provisions of the State Building Construction Code applicable to public school construction (effective January 1, 1971) are included below. The architect or engineer of a project must appraise himself of all amendments and revisions to this Code and design in accord with current provisions.

STATE BUILDING CONSTRUCTION CODE
applicable to
GENERAL BUILDING CONSTRUCTION

C 215 FACILITIES FOR THE PHYSICALLY HANDICAPPED

C215-1 General Requirements

a--For the purpose of this section, facilities for the physically handicapped shall include plumbing, heating, electrical, ventilating, air conditioning, refrigerating equipment, elevators, dumbwaiters, escalators, walks, ramps, parking space, floor surfaces, water fountains, telephones, door hardware and other fixtures and elements affecting the functional use of buildings by the physically handicapped.

b--Buildings set forth in table C 215-1 shall be equipped with facilities to provide access and a safe environment for the physically handicapped. ....

c-- ....

d--Buildings that require facilities for the physically handicapped shall be as set forth in table C 215-1.

TABLE C 215-1 -- BUILDINGS THAT REQUIRE FACILITIES FOR THE PHYSICALLY HANDICAPPED

Occupancy group	
Col. 1	Col. 2
C5.5	Required in all cases

e-- ....

f-- ....

g-- ....

h-- ....

C 215-2 **Path of Travel**

C215-2.1 General Requirements

a--There shall be at least one path of travel consisting of walks, ramps, lobbies, elevators or passageways, or a necessary combination thereof, that provides free and unobstructed access to, and exit from the building. Path of travel shall extend from a public or private roadway, or from an automobile parking space reserved for use by the physically handicapped, to occupied spaces and public spaces within buildings set forth in table C 215-1.

b--The distance along the path of travel from a public or private roadway, or from an automobile parking space reserved for use by the physically handicapped, to a building entrance door shall not exceed 200 feet.

c--Path of travel shall have a durable, finished surface. Steps or abrupt changes in level are not permitted.

d--Path of travel shall extend to at least one public toilet room for each sex and to at least one public drinking fountain.

e--Guardrails at least 32 inches in height shall be provided at the sides of the path of travel where the adjoining surface drops more than 12 inches within three feet thereof. One dimension of opening in guardrail shall not exceed 6 inches.

f--Path of travel shall be provided with artificial light as set forth in section C 507-2.1b.

C 215-2.2 Walks

a--Walks shall have a width of at least 48 inches.

b--Gradients of walks shall not exceed 1 in 20. Where the gradient exceeds 1 in 20, the path shall be classified as a ramp.

C 215-2.3 Ramps

a--Ramps shall have a width of at least 36 inches provided the minimum clearance between handrails is 36 inches. ....

b--Ramps shall have a non-skid surface and a gradient not exceeding 1 in 12.

c--At each end of a ramp and at a door opening upon a ramp, there shall be a level landing at least 4 feet long.

d--Intermediate level landings at least 4 feet long shall be provided so that the sloping portion of the ramp between landings shall have a length not exceeding 2½ times the inverse of the gradient expressed in feet.

C 215-2.3

e--A level landing, with a minimum linear dimension of 4 feet, shall be provided wherever a sharp change in direction occurs in a ramp.

f--Where a door opens upon a landing, there shall be a level area having a minimum dimension of 4 feet and extending at least one foot beyond the jamb on the latch side. The door shall not decrease the required dimension of a landing for any arc of its swing.

g--Ramps shall have handrails 32 inches high on both sides. Handrails shall extend at least one foot beyond the top and bottom of the ramp. Handrail extensions shall be designed so that they do not become a hazard.

C 215-2.4 Elevators

a--Where the path of travel includes an elevator, at least one elevator shall conform to the requirements of this section.

b--Elevator cars shall have a clear depth of not less than 46 inches. An unobstructed area at least 4 feet by 5 feet shall be provided in front of the elevator door on the entrance story.

c--Hoistway doors and car doors shall provide a clear opening at least 32 inches in width.

d--In automatic elevators, the emergency controls and controls for stories that are within the path of travel shall be located no higher than 60 inches above the elevator platform. Controls shall have raised buttons or other means that are identifiable by persons with visual handicaps.

e--Horizontal handrails shall be secured to at least two walls of the car, and located no higher than 36 inches above the car platform.

C 215-3 Parking Spaces

a--Where parking facilities are provided, at least two parking spaces or two per cent of the total number of parking spaces, whichever is greater, shall be reserved for the physically handicapped, except that no facilities for the physically handicapped are required where the cumulative parking area is less than 2000 square feet.

b--Parking spaces shall be at least 10 feet wide, except that a parking space adjoining a walkway shall be at least 9 feet wide.

c--Parking spaces shall be related to the path of travel so that the physically handicapped need not wheel or walk behind other parked cars, and so that the path of travel within the parking area is a minimum.

C 215-4 Doors within the Path of Travel and Doors in Spaces Required to be Accessible to the Physically Handicapped

a--Doors shall be of the single-swing or sliding type. Self-closing devices on doors, and power-operated and power-assisted doors under conditions of power failure, shall have a maximum closing tension of 8 pounds.

b--Single doors shall provide a clear opening at least 32 inches in width. Double doors shall provide a clear opening at least 32 inches in width with one leaf open.

c--In vestibules, the clearance between the arcs of door swings shall be at least 4 feet.

d--Door handles shall be not more than 42 inches above the floor and shall be of a type having a horizontal lever, a square or knurled knob, or otherwise arranged to permit easy operation.

e--Thresholds shall be beveled and shall not exceed three quarters of an inch in height. ....

f--Doors opening into hazardous areas from the path of travel, shall be equipped with door handles that are identifiable to visually handicapped persons as opening into hazardous areas.

C 215-5 Toilet and Bath Facilities

Plumbing fixtures of a type as set forth in section C 215-7 shall be provided as in table C 215-5.

TABLE C 215-5
REQUIRED NUMBER OF TOILET AND BATH FACILITIES

Occupancy group	Plumbing fixtures
C5.5	A water closet and a lavatory in at least one public toilet room for pupils on each story or floor level, and a water closet and a lavatory in at least one toilet room for staff.

C 215-6 Drinking Fountains

Where public drinking fountains are provided and the path of travel extends thereto, at least one drinking fountain shall be of a type as set forth in section C 215-7.

C 215-7 Usability of Plumbing Fixtures

a--Adequate clear floor space shall be provided for access to, and safe use of, plumbing fixtures for the physically handicapped. A clear floor space of at least 5 feet by 5 feet shall be available for turning a wheelchair in general toilet rooms, general bathrooms, and general laundry rooms equipped with fixtures for the physically handicapped.

b--Faucet and operating levers at plumbing fixtures for the physically handicapped shall be of wristblade or other suitable type not requiring the use of the hand for operation. Self-closing lavatory faucets shall be prohibited.

c--Where water closets for the physically handicapped are installed in general toilet rooms, they shall be located in stalls at least 36 inches wide and 56 inches deep. Stall doors, where provided, shall swing out and shall afford a clear opening at least 32 inches in width. Where stall doors are provided, the stalls shall be at least 66 inches deep. ....

d--Where provided for the physically handicapped, wall mounted and pedestal urinals shall be installed so that rim levels are no more than 21 inches above floor level; floor set stall urinals shall be installed so that rim level is no higher than the toilet room floor level.

e--Lavatories and kitchen sinks for the physically handicapped shall have at least 26 inches clearance between fixture bottom and floor for a depth of 10 inches so as to provide sufficient leg room, and the piping beneath the fixture shall be located or insulated so as to prevent injury to persons in wheelchairs.

f-- ....

g--Shower stalls for the physically handicapped shall have non-slip type floors, adjustable type shower heads, and single-lever type mixing valves designed to maintain constant water temperature under variable water pressure and temperature conditions. Mixing valves shall be installed approximately 40 inches above the stall floor and shall be operable from inside and outside the stall by a user at the threshold. ....

h--Drinking fountains for the physically handicapped shall have jets located 31 to 33 inches above the floor and shall have basins projecting 8 inches to 12 inches from the wall or cabinet on which they are mounted. Such drinking fountains shall have up-front jets and controls and shall be designed for hand operation or hand-and-foot operation.

C 215-8 Telephones

Where a telephone for private use is not available within the building, at least one public telephone, suitable for the physically handicapped, shall be provided within the path of travel.

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